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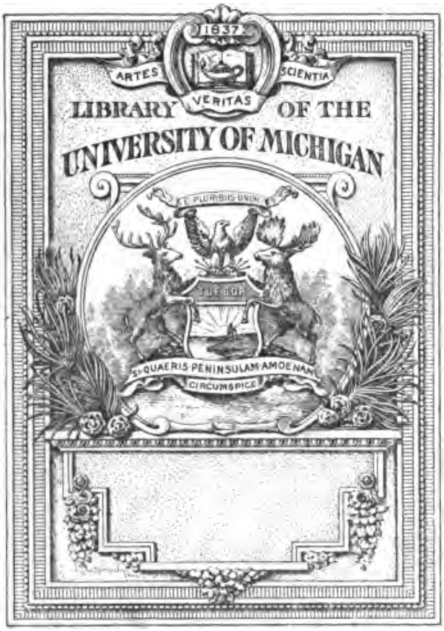

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THE

COMMON SENSE, THE MATHEMATICS, AND THE METAPHYSICS OF MONEY.

BY

J. B.adlam HOWE,

AUTHOR OF "THE POLITICAL ECONOMY OF GREAT BRITAIN, THE UNITED STATES, AND FRANCE, IN THE USE OF MONEY," "MONETARY AND INDUSTRIAL FALLACIES," AND "MONO-METALISM AND BI-METALISM."

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THE COMMON SENSE, THE MATHEMATICS, AND THE METAPHYSICS OF MONEY.

INTRODUCTION.

This essay is a compendium of the science of money, as set forth in "Political Economy of Great Britain, the United States, and France, in the Use of Money; A New Science of Production and Exchange," and "Monetary and Industrial Fallacies," published in 1878; and "Mono-metalism and Bimetalism; or the Science of Monetary Values," published in 1879. In these books I propounded, and, as I believe, demonstrated the falsity of the prevailing theory of money, and the truth of my own. This is a statement of my claim, made in the fewest possible words. I regard the science of money as one of the most, perhaps the most, intricate, and to people at large perhaps the most disagreeable, if not repulsive, in the world. There is, I maintain, a want of words, in language generally, in which to state my theory correctly; and if the prevailing theory be assumed to be false and mine true, such a want *must be conceded* as a sufficient reason for the employment of the words used. Mono-metalism necessarily includes bi-metalism so called, and if three money metals were in use, it would include also what might then be called tri-metalism, but there are only two money metals in use as full or perfect token money, so called by me only. Why I call it full or perfect token money, and all other money imperfect token money, appears hereafter.

It is logically impossible to understand mono-metalism and bi-metalism without understanding money, and to understand money in the light of real and not illusory facts, it is necessary to be able to give, not a single answer, but answers which are not contradictory, to the complex question, What is money? To give these answers correctly, is to show or demonstrate the science of money, and in order to do this and not merely attempt to do it, it is essential not only to take into account all the facts and give each of them its proper weight, without attempting to explain away any of them, but to look diligently for those masked facts which the money sphinx has veiled, and which nothing but the most careful and patient search will discover.

I do not believe that any clear views can be obtained of what is called protection, free trade, mono-metalism, bi-metalism, paper money, banking, etc., until a true science of money is found, and until that is not only found, but generally adopted, it is better to accept the opinion of *leading* writers upon these subjects as the practical, common-sense, logic, and science of the subject, letting the *logic of facts* to take care of itself, as it surely will, after its own fashion, whatever the logical science may be. Mono-metalism is, practically, a mistake under any true theory of money, but the mono-metalists are entirely correct, and their theory of mono-metalism logically impregnable, so to speak, if the bi-metalists and mono-metalists are *both right* in their answers to the question, What is money? Both say that metallic money is a commodity, *bartered* for other commodities when it buys them, and when, to use their expression, it is sold for them; and that all this bartering, selling, and buying, reduced to its simplest terms, means that gold money or silver money is bartered, not once only but twice, before a seller can get what he wants, to use the plainest language possible; but they add, that although gold and silver can be double bartered in this fashion, paper money and bank credit, having no intrinsic value, cannot be bartered; and, therefore, when paper money and bank credits intervene, it must in some way or other be single barter. Some say that checks and bank credits being in use, the banks "deal" in what are called credits, and if metallic money is used, the barterers estimate on one side cost of the metal in labor, and on the other side cost of goods in labor, and that so far as trade balances, so called, between different countries do not carry gold or silver, it is plain, direct, old-fashioned barter. Some of these positions seem to me, to speak with the highest respect, *at least* questionable, even under the general theory that money is a bartered commodity, but they are unimportant in reference to the necessity of mono-metalism, if it be true that the value of metallic money in exchange for a commodity is of the same kind with that of the commodity itself. When copper falls in value, what is meant by the expression, Falls in value? It is really a very complex answer which is called for here. The chief physical or geometrical tangible fact which causes the fall, is an *actual rise in the quantity of copper for sale*, leaving below it the actual geometrical fact that there is a fall in the quantities of other commodities which buyers of copper have to give for it; the geometrical value of copper being the geometrical total of other things which buyers of copper have on hand to give for it, except so far as owners are able to hold it without reference to this geometrical market. If they keep it out of market, the more it accumulates, and when they insist on a sale of all for ready cash, they will have a geometrical fall, not of copper, but of the geometrical quantities which are the value of copper, while the latter will have a geometrical rise, not of those quantities which are the value of copper, but of copper, which is the geometrical value of those quantities. The word Value carries here, and in all similar cases, an indefinite idea of loss *through* the commodity which is said to have fallen, attributed *erroneously* to the commodity itself: the *real loss* is not in the copper, or in the iron or cloth, should it be either of these or any other commodity, but in the loss *resulting* from the uneven application of productive force, which consists in producing something geometrically in excess of what can be given for it, and this happens from time to time on a grand scale, notably in the United States and England, entailing enormous losses, enormous gains, and of late strikes, riots, beggars, tramps, socialism, communism, "greenbackism," etc. The copper or other commodity, when it falls, falls in all other commodities, after making due allowance, assuming it to be possible for the mind to make it, for demand and supply, and geometrical rise and fall which is going on at the same time more or less in other things everywhere. This mental estimate cannot be made, but the logic of complex facts works it out nevertheless through all buyers and sellers. This is the geometrical rise and fall of commodities as I call it in my theory of money, at least for the present, because it seems to me better than any other I can now think of, to illustrate commodity value and money value, and because money itself is really a system of applied mathematics, in order to substitute indirect geometrical barter of geometrical quantities in due geometrical proportions, subject to the variations named, *for direct-barter of those quantities;* the indirect process taking the place of the direct process, through the mediation of a series of arithmetical monetary units always from the beginning, geometrically proportioned *by* weight after being weighed, and from time immemorial, excepting China perhaps, geometrically constructed in cylinders, weighing and measuring alike, except as far as they are multiples or quotients of each other.

The intermediation of money, is in general terms, the problem of stating these geometrical proportions, in terms of corresponding arithmetical proportions, with the units of the series which distribute themselves through sellers to buyers for the most part, the exception occurring when buyers obtain them without having been first sellers. This exceptional use carried to excess through loans, paper money, and other subordinate causes, is the chief cause of commercial, banking, and industrial crises. A seller of goods is *conventionally* a holder of the right to buy goods: an unlimited excess of buying is in this sense an excess of credit. Indirect geometrical barter or exchange has thus been substituted for direct geometrical barter, to the great convenience of buyers and sellers; and not only so, but in my opinion civilized society could not be maintained without indirect barter. The units, if metallic and full token everywhere, are as exact an expression of geometrical value as can be obtained, and the only perfect money in the world, but they are made imperfect by being carried away through war and famine, from where they have been distributed, and through loans and paper money. Stating geometrical values in terms of arithmetical proportions, which seems to be, as it were, as natural to men as language, is the only method I can conceive of whereby one commodity like gold or silver, or both together, can be used for the purpose of bartering commodities, and the barter must *necessarily be indirect;* and hence the arithmetical proportions are inverse to the geometrical. Thus, if copper rises arithmetically 16 per cent., which is a geometrical fall in copper, there is an arithmetical fall and geometrical rise in other commodities. The arithmetical rise of copper expresses, while it is inverse to, its geometrical fall, and the arithmetical fall of other commodities expresses, while it is inverse to, their geometrical rise; and the expression is not perfect, but practically sufficient, if loans and paper money are not in excess. The copper, having by supposition risen arithmetically 16 per cent., the geometrical corresponding rise of *other* commodities is directly expressed by 16 per cent. more money in the member of the proportion which is at the same time the money member in the equation of price which pays for copper, while the geometrical fall of copper is directly expressed by so much less money arithmetically in the member of the proportion which is at the same time the money member in the equation of price which pays for *all* other commodities. The geometrical value of 1 pound of copper in other commodities, before that time by supposition, at geometrical par, has risen geometrically 16 per cent. above that par, and the rise is geometrically demonstrated by a very slight geometrical decrease, and *not* by a 16 per cent. geometrical increase (as *is* the case with silver and gold) of quantity added to the quantity of a commodity previously worth and ex changed for 1 pound of copper. Arithmetical values continue to be, notwithstanding the change, directly proportioned to geometrical values, while arithmetical values are made inverse to each other, and geometrical values are made inverse to each other. If the money be by supposition gold, the abstract, metaphysically conceived, units in the gold coins, which are each outwardly expressed by the unit I, named and embodied in geometrically constructed pieces of gold of exact weight, rise in number 16 per cent. to express the fact that copper in the market, having fallen geometrically in weight 16 per cent., this fall demands a very slight geometrical rise in every other quantity formerly a geometrical equivalent for 1 pound of copper, because the total copper in the market, although *geometrically short 16 per cent.*, *demands*, *as one total*, the same geometrical equivalents it demanded before it fell, and this demand is answered more or less completely in the manner stated. When, after this change, a pound of copper is indirectly bartered to a buyer for money, the money rise or advance of 16 per cent., over and above the old price, denotes mathematically in terms of the first member of a proportion which is at the same time the number of gold units paid through the equation of exchange for all the copper bought, that copper has fallen geometrically 16 per cent., and *therefore* each pound has risen geometrically in value 16 per cent. in other commodities; and in order to express that fact in the proportion, the money paid for a pound of copper rises *arithmetically* 16 per cent., the abstract units carrying their name and quantity of metal along with them to express these complex facts; and thus they cause their metal, as *one geometrical total*, to fall in copper as a geometrical total, by *rising arithmetically* through price, for every pound of copper bought, while at one and the same time in the equations of price paid for other things, and the resulting proportions, they are expressing the complex fact that those things have risen geometrically because copper has fallen geometrically, and the geometrical fall of copper 16 per cent. must therefore be stated *arithmetically in direct terms* by an arithmetical fall in all equations and proportions of indirect barter, sufficient as a whole to cover the 16 per cent.; thus making the gold in money fall in one set of equations and proportions, and rise in other equations and proportions, at one and the same time, although buyers and sellers are ignorant of the weight of their gold for the most part; which is precisely what it ought to do, and was and is unconsciously, as it were, *intended to do*, *in order to be money at all.* The same would be true, even of wheat, if it were practically possible to use it as money: to be money in the *mathematically exact* sense of the word, it must *cease* to be indirectly bartered through money as it is now, for other commodities, in order to allow other commodities to be indirectly bartered for each other *through* itself; and that can only be done by the introduction of another element of value, displacing *prò tanto* commodity value, and putting in its place arithmetical value; like that of gold and silver money for instance. In addition to weight in general, which is sufficient for present commodity use of wheat, it would be necessary to fix by *corporate* agreement what weight in wheat, the abstract unit I, when named, shall carry: 10 bushels or centals of wheat to the unit will furnish only $\frac{1}{10}$ the number of units which 1 bushel or cental will furnish, and *therefore* 10 bushels (one total) as money is worth 10 times 1 bushel as money, *not because* the 10 bushels carries 10 times the weight, *but because* 100 units as money, if that be all the money there is, is worth as much as 1000 units, if that be all the money there is; the weight in wheat *carried* by the units, being *dead weight* as commodity *for private consumption*, and live weight only through corporate consumption, for the purpose of fixing as a co-efficient the mathematical status, so to speak, of the abstract unit I in 100, which is the equivalent geometrically, *in* commodities at large, of 10 units in 1000; and the mathematical principle would be the same if the units were embodied in arithmetical form, on good bank or government paper, if current, marked I, named, and made satisfactory as a token. Gold and silver are *geometrically* proportioned at 15½ and 1, for the most part, and not *merely* weighed like other commodities when used as money. This geometrical *fact* controls the commodity proportions found in the bullion market, because the unit, *as a unit*, is worth vastly more to the holder to buy other commodities, than its commodity could by any possibility be for individual use. The consumers of gold and silver plate may be called in one sense a corporate community, acting without intentional concert as individual consumers, to a common purpose and end. Silver is produced, say 30 to 40 pounds for every pound of gold; the natural commodity ratio of production being thus on the average between 35 and 40 to 1 of gold. In the absence of money, consumers might carry up silver, possibly to 10:1 or even 5:1, but the *geometrical ratio* being fixed at 15½ and 1, for the most part, largely overrides and controls the ratio, *not of production*, by any means, but of the ratio of consumption corporately and individually, or, in other words, the ratio between the private consumption of gold and silver and the corporate consumption of gold and silver; and also the private consumption of silver on the one hand and gold on the other hand. The German corporation has abandoned the use and consumption of silver as money for the most part, and introduced the use and consumption of gold, bartering off the most of their silver for gold and consuming and using gold in its stead: they have thus bartered silver largely *into* the market, and gold *out* of the market. They did not abandon the bartering of silver for commodities in general, and introduce the bartering of gold for commodities in general in its stead, because they had *no power*, even as *an imperial corporation*, to do anything of that kind, inasmuch as that belonged *exclusively* to individual members, but they did abandon the use and consumption of silver in the character of tokens by weight, whose mathematical value as units was maintained by the coefficiency of silver weight (in all the *indirect bartering* carried on by the members individually), *because it was impossible* for the members to act *individually* in a matter of that kind. Geometrical values are demanded and supplied by producers who are also consumers (users), but arithmetical values, whether they carry gold or silver with them, *are intangible* and can no more be grasped than *entity* and *quiddity:* they are the metaphysically conceived and mathematically expressed units, placed actually or presumptively between two or more geometrical values, to *compare* their magnitudes and values in exchange, and state the comparison, when made, in units of "measure." To affirm that pyramid is twice as large as pyramid , is the same thing as to say that the first pyramid is to the second as 2 to 1. If these geometrical totals are brought *directly* together and compared, the owner of *a* and *b* have no occasion to embody the units of 2 and the unit 1, making 3 units in all, in order to settle the terms of exchange: the units of 2 are already *metaphysically* embodied in *a*, and the unit 1 in *b;* and the pyramids *a* and *b* can be exchanged without giving the units *any other body* for the purpose of carrying them away in that other and *new* *body*, to compare and exchange other geometrical quantities; but if pyramid *a* is demanded by consumers, in the *absence* of pyramid *b* or some other like geometrical quantity, there is *no possible mode* of exchanging it thus *indirectly* for some other geometrical quantity, on the part of the owner of *a* or his assignees, but to *unbody* the units in *a* and *b*, and *embody* them in some other geometrical and tangible form, or in a documentary form of some kind, to be used, *not* as geometrical quantities themselves, *but as units and tokens;* the geometrical quantities in which they may be embodied and carried about becoming thus *the co-efficients* of the abstract units, in proving what they have been taken for, and thus what they ought to be taken for again; geometrical quantity being waived as commodity for private use, in order to obtain other commodities for private use. Geometrical quantity, as commodity so waived, while thus carrying the unit, becomes *dead weight as commodity for private use*, by its conversion into live money weight, worth vastly more as a co-efficient and token of the unit. It is impossible for weight to be a perfect co-efficient, unless it is made of itself a perfect token *by and through its weight only*, as an exact geometrical indicator of the number of units which a holder is entitled to carry. To maintain that this *invaluable* live weight, as commodity for corporate use, is really live weight as commodity for private use, is to contend for an *impossible* direct barter of *a* and *b*, *after* the owner of *a* has parted with it to-day, with the expectation of getting *b* or any other geometrical quantity as yet unthought to-morrow. It is impossible to compare two geometrical quantities *a* and *b* while separated, except through a series of units, and because the end of *a* is *b*, and of *b*, *a*, whatever intervenes cannot be *intellectually* a geometrical quantity itself. The German corporation having refused to consume silver as the corporeal body and carrier of units in their series, and having bartered their silver for gold, have carried into the bullion market, with the quantities coming from the mines, 16 per cent. geometrical excess of silver: the embodied units of silver and gold are now, as always, inverse, when used in the proportions of indirect barter, to the silver and gold in the bullion market, or, in other words, while they (the metals) carry the units, *the units* make the metals which carry them, as *two great geometrical totals* geometrically inverse to the two small geometrical totals of the gold and silver which are now in the bullion markets of the world.

The corporators of the great German corporation, as holders of gold tokens at 15½ and 1, can inversely get *only* 15½ pounds of silver for every pound of gold they have in marks, if they buy goods at home with their gold, export the goods, sell the goods for silver, and import the silver; and if they barter that silver for gold they will lose 16 per cent. in silver; but inversely again, they can ship gold abroad, not to buy goods but to barter for silver, buy goods with the silver, import them, sell them at home for say $1\frac{16}{100}$ pounds of gold, and then inversely barter that gold for 20⅓ pounds of silver at a profit of 16 per cent. in silver (20⅓ : 1) instead of a loss of 16 per cent. in silver (15½ : 1), while the members of the corporation of consumers of gold and silver plate can buy silver plate, say (fractions excluded) 16 per cent. cheaper than before. Gold and silver buy goods at 15½ and 1, *where they are being consumed as money*, and are, through goods, equivalents at that par, in $\frac{9}{10}$ of trade. If silver were required to pay *toll or bounty of* 16 *per cent.* on these $\frac{9}{10}$, international trade would be out of the question, but silver pays toll *only when it carries its abstract unit abroad actually, or through bills of exchange constructively*, in order to pay taxes or debts; and then it has to pay toll of 16 per cent., which, in process of time and gradually, will give way, in another form, to *a toll of* 16 *per cent. against gold.* The geometrical spoliation extending only to 16 per cent. of $\frac{1}{10}$ of trade, or say $\frac{1}{80}$, is readily compensated, and its evil effects lie *more especially* in the discouragement of trade directly, on one side or the other, and thus indirectly on both. Because all trade is indirect barter, and the units carried by gold and silver, the intermediaries through which it takes place, the geometrical spoliations of mono-metalism can be compensated for the most part. To suppose that the *geometrical* ratio of 15½ and 1 is an attempted fixation of the commodity ratio, is *an illusion* which follows *after* the illusion that gold and silver are *geometrically bar-*

tered as commodities for commodities in purchases and sales, when in point of fact the ratio is not a commodity ratio, dependent upon metallic production which is in a state of fluxion continually, and which cannot be fixed, and, even if it could, ought not to be fixed. The *leading geometrical ratio* prevails continually, because the end and aim of trade is to obtain goods *by indirect barter*, and the geometrical 15½ pounds of silver in silver units, and of 1 pound of gold in gold units, are interchangeable *through* goods *continually*, because the silver and the gold, while carriers of their units physically, are carried by their units metaphysically, and do not themselves carry the units in this barter. They are units of comparison and exchange between numerous geometrical commodity totals, and not intellectually commodity totals themselves. *As such commodity totals*, they can no more indicate to the mind the exchangeable geometrical value of like totals not brought directly in view, than the brick which the Scholastikos, in the facetiæ of Hierocles, carried about, to show the value of a house he wanted to sell, could demonstrate the value of the house. Geometrical values can without superposition be related by units only, whether brought face to face or side to side before the eyes; or separately, one at a time. If private consumers of gold and silver commodities like plate could consume twice as much as they now do, they would do so, and the remaining gold and silver would be worth just as much as the whole for monetary use, and be actually better, because lighter; but they cannot do it, because the commodity value of the remaining units would increase in geometrical proportion. They are *compelled to stop demanding* any more, because they have nothing geometrical to demand with, while the corporation of money holders *never demands at all*, taking as much or as little as comes. Mono-silver countries would take 10 times as much silver as they will get, and mono-gold countries would take only $\frac{1}{10}$ of the gold they will get, if no more came to them through buying.

The miner is *not* paid by *selling* a commodity he mines for; he is paid *in money* for his labor, as are other laborers. The *general idea* is that he gets a commodity, gold or silver, for his labor, and the idea is correct; but there is a *monstrous fallacy* concealed in the idea, because there are *two* uses to which the metallic commodity may be put by him after he gets it, just as there are two uses to which any holder of 20 dollars in gold or silver can put the dollars. He can buy with the gold or silver, or he can work it up into plate *himself*, or by his laborers. The only other use is that of the corporation of buyers and sellers. The first is a private, the second a corporate use; but if he puts it to private use in the manner stated, it costs him money + labor. There can be no question that gold and silver are commodities, *whether they are used corporately or privately*, nor can there be any question that gold falls in silver, and silver in gold, silver being at this time 16 per cent. below the geometrical par of 15½; but this is not a geometrical fall of silver in goods 16 per cent., and would not be, even if silver as money were a commodity, for a fall of 16 per cent. in its bullion quantity geometrically would not amount to a fall of $\frac{1}{100}$ of 1 per cent. in all commodities. It has fallen 16 per cent. in gold, because it has nothing else to fall in; and this fall, if it has any effect outside of the bullion market geometrically, is inversely a rise of silver in other commodities where silver is current. The geometrically constructed unit cylinder of silver is at this time 16 per cent. below the geometrical par of 15½, but there is no fall of silver, either in gold or goods, nor is there any rise of gold in silver or goods, as money: silver is still exchangeable for gold and gold for silver, at the geometrical par, *through goods.* It would be nonsense, to say that silver had fallen 16 per cent., in luggage checks delivered at railroad stations, even if they were redeemable in other luggage at the will of the holder, but it would be actually no more contrary to fact than to say that silver has fallen as money. Gold is money and silver is money, and both are at the same time commodity. The *small* quantity of bullion silver has fallen as commodity in gold as commodity 16 per cent., but not the $\frac{1}{16}$ of 1 per cent. as money, while the small quantity of bullion gold has risen as commodity 16 per cent., but not the $\frac{1}{16}$ of 1 per cent. as money. There is an overpowering illusion which makes us all think that it has fallen as money; but the illusion would leave us, if we were able to see behind it, what is the real fact, that silver money means a series of units of silver commodity, whose geometrical apportionment of weight and construction cost little or nothing, and are really money in the true primitive, and even present, sense, and that the money value of silver which the commodity carries is not the *commodity* the money carries, but a part of the function, if not indeed the chief function, of money; a thing which can no more be grasped than an *incorporeal hereditament,* the right conferred and evidenced by a luggage check, or a certificate of stock, issued in pursuance of transfer and book entries. The *money function* is what gold and silver both perform through human agency, and that function is *indirect* barter, *not direct* barter. It is *this function* of silver which has been abolished within the last few years in the western world, and not the *sale* of silver plate, nor the *bartering* of silver for gold. No man, if sane, could suppose that the value of counters, for the purposes of counting, had fallen, because their material had fallen in price, but it is really just as absurd to say that silver has fallen as money, although the sanest, ablest, and soundest men in the world believe it to be a fact. A commodity falls geometrically in other commodities in all cases where it rises geometrically as to them or they fall geometrically as to it. One or the other of these changes has occurred between silver and gold, and, whichever it is, the small quantity of silver in bullion is geometrically in excess 16 per cent.

Why is this excess of 16 per cent. a fall of silver *in gold only* and not a fall at the same time in other commodities, like copper and platinum, which fall in all other commodities *when* they fall; the fall being expressed in money? Because gold, although a commodity, is money, and silver, although a commodity, is money. Each *has the function* of money, and copper and platinum *have not.* Abolish the function, by refusing to consume either silver or gold in the corporate process of indirect barter, nationally and internationally, and you have silver and gold where copper and platinum are now. The corporation is controlled, and speaks and acts by, government for the most part, but it may act *socially*, *independently* of the government, if situated as California was at the beginning of the civil war, aided by a *subordinate* state organization. The people of the United States *might*, in their social capacity, have *refused* to use "greenbacks," if they had been in possession of enough gold and silver, and the people of France, *having enough gold and silver*, could certainly have done the same thing, at the beginning of the late Franco-Prussian war, but they did *a better thing*, by retiring their gold and silver, giving up *their right* of barter to the government, and ultimately funding the paper and bringing the gold and silver *out of retirement.* Gold and silver, having the function of money, *cannot* be sold for money, because this would be selling money for money; and *this* sounds absurdly to me, and I *think* it is absurd without doubt. But they are both at the same time commodities, that is to say geometrical quantities, and if there are 18 pounds of silver in the market to 1 pound of gold, instead of 15½ pounds of silver to 1 pound of gold as formerly, silver is geometrically in excess of gold and gold is geometrically in defect of silver, each 16 per cent. in the bullion market. It is therefore supposed that silver is below the "*standard*" of gold, but this is utterly false, because the price of gold in commodities depends upon the number of gold and other units circulating in company with it, and there has been little if any change therein as yet. It is impossible for gold to buy, or be sold for, silver, or silver to buy, or be sold for, gold, for buying and selling are *indirect* bartering; an exchanging gold for silver and silver for gold is *direct* bartering. The object of bartering off goods is to buy *after* bartering, and silver having fallen 16 per cent., there is a 16 *per cent. profit* in bartering gold for silver, either directly in bullion, or indirectly through bills of exchange, and buying goods in mono-silver countries, to import into mono-gold countries. This extra buying power of 16 per cent., exerted through silver, is so much in excess of previous selling in mono-gold countries, and *helps to maintain the prices of mono-silver countries*, but the silver unit has to pay a toll of 16 per cent. when it undertakes to carry its unit over into gold countries and buy goods *through* gold, and therefore it does not go at all, but submits to an arithmetical dockage of its series at home, through bills of exchange, which costs less and saves carriage. Mono-metalism offers a good field for the study of the science of money, in the light of actual facts generally, and in many respects particularly. The United States ought, instead of coining so much silver at 16, to coin all that is and will be wanted at 15½ and *no more*, and *all nations ought to let the whole subject of bi-metalism alone*, and let the scientific world have time to come to some understanding upon it, in *pursuance of a theory founded on facts*, which, in process of time must occur. The present theory is founded on *apparent* facts, as was the Ptolemaic theory of the universe, and the illusions to be overcome are stronger than those which maintained the Ptolemaic theory. How can the illusion that gold and silver are bartered for goods, and goods for gold and silver, and that all money, in order to be money, must carry *for human intellects*, an *intrinsically valuable commodity*, be overcome? It must be very hard to overcome, or it would have been overcome before this time.

When a suit of clothes is bought, we all know that buying that suit is means to an end, and that the end is the service afforded by the suit, in wearing and consuming: if the suit could be had without buying, it would not be bought, but it would still be a commodity, even if produced and made by the consumer, out of his own materials, which he *had never bought*. This is exactly the case with gold and silver. *Their market is each other*, and each other only, but a very small portion of either is actually bartered, unless with view to a profit, and large amounts go into consumption as money without being bartered at all, and when they thus go into use as money and are *consumed in that use*, the *illusion* is, that this use, which consists in indirectly bartering geometrical quantities intended for individual consumers, is *itself a bartering of the gold and silver*, when the only bartering of either is for the other. This function can be, and has been, repeatedly abolished and repeatedly restored, but when the science of illusions and common sense gives way to the science of fact, we shall have universal bi-metalism, a storage of gold and silver, and a use of them without handling, except when absolutely necessary, because their function of indirect barter can be performed just as well without handling in most cases, and with greater convenience, directly though checks, and indirectly through bills. Banking is a field where indirect barter can be studied to great advantage. The banks are said to deal in credits 99½ per cent., and commodity ½ of 1 per cent. There is a great deal of actual, and much more of apparent, truth in this theory, if the words are construed by facts, but the actual truth is, that there is no direct barter for a credit, or for gold and silver. It is an indirect barter, because buyers and sellers inside of banks are related to each other *not directly*, but *indirectly*, precisely as they are outside of banks, when they actually handle gold and silver. It is a highly convenient method of indirect barter, but not of direct barter, and the abstract units are written on and off checks and books, when in the case of gold and silver and bank notes passed outside of banks, on the contrary, there is frequently no entry at all. This is a *true* theory of banking, founded on analysis, and not illusions. If there were no gold and silver money in the vaults of the banks, or a general depositary holding for them, the banks would fail, and they could not help keeping, on the average, much more than ½ of 1 per cent., were they to strive to do otherwise, because they would fail before that point could be reached. The general depositary does not hold a *joint* fund to be drawn against as such, but each bank has a *separate* fund *jointly* kept. When monetary science is founded on real facts, then it will be seen that unless the words are used in a very different sense from that now prevailing, there is no *real* meaning in the expression that a bank deals in credits, and still less in the expression that it deals in a commodity, *because the credits are abstract units*, and the commodity dealt in not a commodity, as it *seems* to be, but the *function*, use, or consumption of a commodity, which can be abolished *by not consuming*, while the sale or barter of a commodity is only means towards the end, which is individual consumption, or, in other words, individual use. It will then appear that if only ½ of 1 per cent. of gold is actually delivered on one or the other side of the bank counter, or into and out of cellars, as undoubtedly will continue to be the case, diminishing rather than increasing, this is not an economy of a commodity gold, silver, copper, or platinum, but *of the mode of exercising* the function of the commodity, gold, silver, copper or platinum, as money. It will further appear that economy *of use* in its real sense, founded on facts, demands, if possible, not a varying quantity of gold as a *geometrical total in pounds, ounces, and pennyweights* in the cellars, without reference to a series of units to be constructed out of that total, but an arithmetical limitation of the number of *unbodied* arithmetical units on *all* bank books, by a definite number of *embodied* metallic units in the reserve, for the purpose of putting a *general arithmetical limit* to all bank loans at some definite point, in order, by so doing, to stop, at that point, any more buying until there has been more selling; or, in other words, any more doing of the last half of barter until there has been more doing of the first half. There is no such thing, therefore, as *money standard* as a " measure of values " in gold, silver, or *any other geometrical quantity;* for that is impossible. The only standard, actual or conceivable, and that in an undefined, uncertain sense, is the abstract unit I, of which the metal gold and the metal silver is made by corporate agreement and use, *the corporeal body, the carrier, the standard co-efficient, the token, and the vurchasing power.* The live metallic weight of individual consumers is thus by corporate agreement and use converted into dead weight as a co-efficient of the unit in limiting its arithmetical series as steadily as possible, *not by weight*, but by a *geometrical apportionment* of weight to each unit, whether in bars, ingots, or cylinders, while dead weight, as live purchasing power for corporate use, becomes worth 10 times as much as live weight in commodity gold or silver for individual use. If we take a series of 10 units and call it purchasing power, 1 unit in 10 is worth 10 times as much as 1 unit in the series, had the total series been 100. The metal of the unit becomes what may be called a standard co-efficient of the unit, and the unit itself, thus weighted, limited, and carried, becomes a measure of values in the following sense: if 2 geometrical quantities for consumer's use are brought together for exchange, and one is called (measured) 3, this calls (measures) the other 2; the limitation of the first geometrical quantity arithmetically by 3 limits and measures the other by 2, and *vice versa.* The whole series is thus limited *to* 5, by limiting the first member of the proportion, either to 3 or 2, according to the quantity *first called.* The only possible way of measuring either quantity is first to state, metaphysically and mathematically, the arithmetical value of one of the quantities, and then the value of the other *follows logically by relation to the former.* The *first quantity* might just as well have been stated 15, and this would logically or mathematically have measured the second by 10 instead of 2.

In this *possibility of arithmetical variation in money, even if gold and silver*, lies the *impossibility* of a perfect measure of the values of geometrical quantities of commodities exchanged *indirectly.* Gold and silver have extended their joint series to such a length, that it requires a large addition to, or subtraction from, it to produce any perceptible effect, and the grand sources of variation are now chiefly confined, not as formerly to the production of the mines which could only have been checked somewhat, by *weighting the units geometrically in proportion* as nearly as could be guessed, but to abstract units written on and off government paper money, bank paper money, and bank books under *the name* of bank credits. The name Bank credits is a *logical* inference from the illusory fact, that the money in the reserve is a *geometrical quantity* instead of an *arithmetical quantity only*, although in the *form* of geometrical quantity; saving *always* the very suggestive fact, that the money of the world is for the most part, *not bars and ingots*, but *geometrically constructed* and weighed units which really form for us, if we think long enough, not a *geometrical total of so many pounds*, but an arithmetical series, of as many units as *the total pounds can furnish by corporate agreement. Mono*-metalism docks the arithmetical silver series in exchange 16 per cent., if silver is geometrically in excess in bullion 16 per cent., and *vice versa* silver docks that of gold 16 per cent., if gold rises geometrically 16 per cent. in bullion. Barter, double barter, standard *by* weight, and rise and fall of *gold commodity* as money, are the various phases or forms in which the illusion that *all* geometrical totals can be, and are, measured by *one*, intervening geometrical total, *is expressed in words*, whereas they can only be related or measured *by means of another geometrical total*, *only* by *waiving* geometrical quantity in the latter total; *dividing it into equal parts by weight*, actually or constructively, and calling these parts *so many units*. When this metaphysical and mathematical truth is applied and made useful in money, we shall have universal bimetalism, regulated paper money, and, as far as possible, regulated banking. It might be better, ultimately, to have silver at 15 instead of 15½, to avoid fractions, but this is a matter of minor importance. *My* theory of money is founded on all the facts, explaining none away, but, on the contrary, relating them harmoniously, and giving each due weight. If my theory is true, it is mathematically impossible to have *steady* prices, even with the use of gold and silver, if *the use* continues to be grounded on the false and illusory fact, that money is *a commodity* of "intrinsic value." My theory demonstrates that paper money is *actually* money, as it is *actually* called, but it is an unbodied unit of an arithmetical monetary series of an indirect barterer's proportions, and also of the units of the whole monetary series, regarded either as the grand divisor of which all commodities are the grand dividend, or several divisors of which several quantities of commodities are several dividends. But my theory also demonstrates that while a series of gold and silver units is, *as a series*, mere units, metaphysically and mathematically, they may, under a *proper limitation* of their use (consumption), be made vastly more effective in maintaining steady prices, and preventing the geometrical spoliation of consumers, through arithmetical rise and fall, not of gold and silver, but of the numbers of units written on and off bank notes, government notes, bank books, and checks, and *bills of exchange* through mono-metalism. It is a *puerile* inquiry under my theory, whether $\frac{1}{2}$ of 1 per cent., or the $\frac{1}{10}$ of 1 per cent., is actually carried out or in, through checks of buyers. The quantity in the reserve ought to be just the same whether much or little is carried out or in, because it is not a geometrical limitation which the gold and silver furnishes *by pounds*, but an arithmetical limitation of the *use* of the unbodied unit of purchasing power in the manner stated, the effect of which is *through the exertion* of purchasing power, a geometrical discord in the proportions of commodities produced. Arithmetical discord leads to geometrical discord of production, geometrical spoliation of producers and consumers, and lottery of trade.

The human race, it is said, has been stimulated in its progress by the increased production of gold and silver. Stated in this form, the proposition is not true. It is the combined effect of the fall in purchasing power of the monetary unit, whatever its outward form, called A general rise of prices; the right of buying where there has been no selling; the resulting stimulus to production, and even to the advance in luxury that follows, which stimulates the progress. This stimulus told greatly in Rome; still more in the sixteenth and seventeenth centuries everywhere, and very much in Great Britain and the United States, under irredeemable paper money and banking. The dead metal of the unit of purchasing power has no more efficacy in stimulating production than the unit written on paper money, if that conventionally takes purchasing power. The metal piled up in the chests of Lucullus at Rome told largely on the prices of luxuries, and comparatively little on the price of corn, and such has always been the case, under like conditions. The dead metal of gold did not keep its unit from falling in purchasing power in the United States under irredeemable greenbacks and written "credits" on bank books. The bartering unit of purchasing power fell in the United States, whether it was carried by gold or not, but the gold unit carried a premium to buy abroad, or pay duties. The *small* quantity of gold in bullion may rise or fall in silver, and the *small* quantity of silver in bullion may rise or fall in gold, because there is nothing in the world to barter gold for, unless it be silver, or to barter silver for, unless it be gold; both being equally money, and therefore incapable of buying and selling each other. The question of prices is not the question of rise and fall of gold and silver, except when, because one or the other being uncurrent, as is now universally the case, a very small amount of metal in the bullion market is the measure arithmetically of the dockage, the toll, the premium, or the discount, to which outside of the bullion market a unit, among millions carried as a total, by 100 times the weight of metal in the bullion market, must submit; the weight of the metal being dead weight in the one case as well as the other. *There must be* some (*not* "*standard*," but) standard test by which to determine the rate at which the uncurrent unit shall be exchanged for the current unit, and the bullion market is the illusory market by which the rate is found, whereas if the unit were merely written *on* bank notes or in some other current form, the unit so written on would have no toll to pay, save only the just and equitable toll it ought to pay, when it is below the par of purchasing power of the unit of the country where it goes actually, or by bills constructively, taking just and equitable toll in like manner from the other unit if it happens to be above its par of purchasing power. This advantage the unbodied written unit has over the embodied unit of gold and silver under general mono-metalism, as it would continue to have if the metallic unit in which if convertible it is redeemable were by any possibility to cease to be money; but my theory demonstrates plainly, because metaphysically and mathematically, that the unbodied unit, whether written on bank books and checks, or on paper, *must* be, not merely convertible, but convertibly limited or arithmetically covered by a definite number of embodied units, if steady prices are really an objective point.

The *real* cause, and the *only* real ground of complaint on the part of "labor," whether of body or mind, is the lottery of labor and capital which results from too great excess of buying over and above selling. Inequality of accumulation and its maintenance are *absolutely necessary* to human progress, because without it no man could, and under equality of accumulation no man would if he could, labor for any one but himself. Upon this dead level there could be no progress, and this is the plain, short mode of stating the truth without any ambiguity; but it may well be questioned whether the exaggeration of this necessary, and, because necessary, desirable, inequality through paper money and "bank credits" has not been carried far enough to need some *general* limitation by a mathematical law, as far as possible. But be it so, or not so, it is high time of day to try to find a *metaphysical and mathematical basis*, on which to found a true science of money that will not perpetually contradict itself, and to make man, as far as possible, the master, and not the victim, of the creature of his own creation. Values of commodities are more or less the creatures of the human intellect, individually, and money value altogether the creature of the human intellect collectively. Man can collectively put on money value or take it off, from anything which can be used as money, but other values are needed individually, and his power is limited more or less by personal wants. We are now in an advanced stage of knowledge in production, but in the Ptolemaic stage of knowledge in money, and we must remain there until by careful analysis of facts we can emerge to the Copernican stage; and the first thing to learn is, that we have confounded the function or use of a commodity with the barter of a commodity: we can create or destroy the former, but not the latter.

I have used the terms Arithmetical and Geometrical in order to illustrate my theory in a manner not possible through the use of other words, because other terms like Commodity, Rise of gold or silver, etc., are associated so strongly with the Ptolemaic idea of "intrinsic" value in gold and silver equal to their value in exchange, that it is impossible to disassociate them sufficiently to demonstrate a contrary idea by their aid, and, therefore, I have used the word Commodity only occasionally, in order to connect it as tangible quantity with the word *Geometrical*, and rise or fall of gold or silver with the word *Arithmetical*, in order to disassociate gold and silver on the one hand, and commodity on the other hand, with a view of aiding the mind in the perception of the metaphysical fact, that the geometrical proportions between commodities, with the innumerable varieties of utility and desirability they possess, which goes by the name of Intrinsic value, can *be thought only* in arithmetical language, which thus becomes *perforce* the *natural* language for not only thinking and speaking and writing, but *also acting* upon them in all exchanges between buyers and sellers.

Buying and selling constitute the action of buyers and sellers, but before that can be brought to perfection there must be some commodity of high utility and comparatively small bulk, geometrically apportioned into units by a known standard of weight and gradually and *slowly* distributed to sellers through buyers. The very foundation and stepping-stone of money thus becomes *a credit* in the hands of a buyer who *first of all* comes into the possession of the money, but this credit is soon paid by a debit in his favor, *not valuable in terms*, but, on the contrary, invaluable in terms, and absolutely priceless through the benefits conferred. It is carrying this *credit* to excess at subsequent stages of development, by breaking up the distribution of the geometrical units, and redistributing them *away from* those who have given commodities for them in the numerous channels of national and international trade, by war, famine, mono-metalism, bank and government paper money, and *bank* credits, which deranges the proportions, the equations, and the dividends, on the geometrical side between commodities, by creating too many buyers for all the sellers. A reaction sets in, without regard to the kind of money used, because, and *only because*, the end and aim of money is the exchange of geometrical quantities having utility for buyers and sellers. It is impossible to understand the phenomena of production, consumption, and exchange of commodities without having a *clear* idea of money, and to have that idea, the *actual facts* or phenomena of money must be perceived. But these cannot be perceived without looking inwardly as well as outwardly, and the very first mental phenomenon is, that a *mental* intermediary of two geometricals of "intrinsic value," of which *one only* is perceived, at the moment when the complex operation of looking outwardly at a geometrical bought and sold, and relating it inwardly to *any* one, that is to say, to all geometricals for sale everywhere, is going on, must necessarily be the I embodied geometrically, not in an individual consumer's commodity, but *invaluably* in a corporate consumer's commodity, as a token of right, or expressed in some other form. When this mental phenomenon is clearly perceived by the eyes of the intellectual man, the Ptolemaic phenomenon of individual consumer's commodity intellectually retained in this intermediary will then appear as it actually is, an illusion before the eyes of the intellectual man, which has heretofore prevented him from perceiving intellectually, that he *must intellectually waive* individual consumer's geometrical value in the money he pays or receives, whether it be gold, silver, paper, or written credits, when he is *corporeally waiving it* every time he buys; and that the *actual* phenomena are an intrinsically valuable individual consumer's metallic commodity called gold or silver, carrying in the world's commerce a very high conventional value, which has superseded the individual consumer's value, and taken its place, performing an invaluable service for the corporation of buyers and sellers, which cannot be performed by the *unbodied* unit of purchasing power alone, either on paper or in credits. The intellectual eyes will then gradually perceive that the corporate consumer's commodity, having been naturally developed mathematically into units geometrically proportioned by weight, weight thus *naturally* becomes the co-efficient in the hands of corporate consumers of the I in maintaining the value it carries, in all mathematical proportions of indirect barter, and all equations of exchange of geometricals for arithmeticals. And *because* the arithmeticals can *never* exceed the geometricals in value; *because*, I repeat, they (the arithmeticals) can never exceed the geometricals, millions of tons of gold and silver would make no more money than we have to-day, and *all the geometrical capital of the commercial world* must always be 20 times as great as its *arithmetical capital;* and *therefore* all the money in the world is an arithmetical monetary series the gold and silver units of which, now geometrically proportioned by *various* weights, if by supposition geometrically reduced to one and the same standard of weight, will arithmetically reduce all the unbodied units of paper through addition or subtraction, as the case may be, to their own arithmetical standard, and thus form a series which is at one and the same time a divisor and which, extended even to infinity, can never exceed arithmetically the value of the dividend, because the geometrical dividend (commodities) is the only value of the divisor. The intellectual eyes will then perceive that the rise and fall of gold in bullion is a rise and fall of *small masses*, and that their rise and fall is one of the *necessary* and absolutely unavoidable consequences of the law of all *direct geometrical exchange;* all direct barter of *one* geometrical, for *one* geometrical; which is, that if the first *one* geometrically rises, the second *one thereby* geometrically falls; and because the exchange of first *one* and second *one must* go on, there being no other market, the owner of a part of second *one* has made a geometrical gain in first *one*, by means of the exchange, which, under universal "mono-metalism," may give him an arithmetical gain in purchasing power, of 16 per cent. in silver arithmetical units, and to-morrow (that is the figurative expression for, say 15 years, if mono-metalism continues) in gold arithmetical units. All this is, and *is only*, *because* money value is arithmetical value between two or more geometrical values. All the arithmeticals are the exact complement of all the geometricals. The *small* geometricals (gold and silver) in bullion are *worth nothing*, save and except as money to buy geometricals for individual consumers' use, through their conventional employment by all the corporations of buyers and sellers throughout the world. They are the corporeal bodies, the carriers and the payers, of the metaphysically conceived, and mathematically applied I, in all the indirect barter of commodities, all the equations of purchases and sales and all the divisors which are continually pay ing consumers' dividends of commodities, and they are at the same time receiving all the producers' dividends, which are being continually put into the grand dividend in exchange for units of the divisor.

Under this theory of money *founded* on *all* the phenomena, the 16 per cent. arithmetical premium paid the geometrically proportioned gold unit by the geometrically proportioned silver unit, or, in other words, the discount of 16 per cent. suffered by the silver unit, has no foundation in *actual* "*standard*" values, but precisely the reverse. Therefore Premium and Discount, as read *here*, *in this place*, by the intellectual eyes, mean exactly the reverse of what they mean in another place, where the unbodied units, under the designation of 1 (dollar, pound, or franc), are in a series arithmetically long or +, by 16 per cent., as compared with a series wherein there is no +16 per cent., thus making the first series +16 by relation and the second series —16 by relation. In such a case to avoid geometrical spoliation through bills, first series naturally owes second series in exchange +16, and second series has a credit arithmetically of +16, which is arithmetically expressed by premium, as the debit or — of the other is by discount. No debt of this kind, either commercial or arithmetical (in other words, mathematical), is due by the silver to the gold unit, and when gold falls hereafter, no debt of that kind will be due from gold, but, on the contrary, it will be entitled to a + or credit of say 8 per cent., and silver chargeable with a — or debit of 8 per cent., the former rising 8 per cent. in commodities, by an arithmetical fall of 8 per cent., and the latter falling 8 per cent. in commodities, by an arithmetical rise of 8 per cent. But gold will not receive this +8, nor will silver pay this —8, because they pay and take as geometricals only under mono-metalism, and not as arithmeticals. Silver pays what is called premium now, and gold receives it, according to the bullion market, and when silver rises inversely 8 per cent. in bullion and gold falls inversely 8 per cent. in bullion, silver falling at the same time inversely in commodities by an arithmetical rise of 8 per cent., and gold rising inversely in commodities at the same time by an arithmetical fall of 8 per cent., gold will then pay the premium of, say 16, and silver will receive it. The phenomena can all be stated in general terms, as a series of inverse movements, mathematically and mutually complementing each other. Silver is now geometrically "long" and gold geometrically "short" in bullion, each being neither long nor short in commodities: *therefore*, silver is arithmetically debited 16 in exchange. *Per contra*, when silver is (inversely) geometrically short of its present long of 16, by 8 per cent. in bullion, gold will be (inversely) geometrically long of its present short of 16, by 8 per cent., and the two geometricals will be back to 15½ : 1. But the *result* of making silver geometrically short by 8, and gold geometrically long by 8 in bullion, — a difference of 16 per cent. from what they *now* are

— will be an arithmetical long of silver by 8 in commodities, and an arithmetical short of gold by 8 in commodities, giving a series of inverse geometrical proportions and inverse arithmetical proportions, in place of the present *one* inverse proportion, of geometricals *in bullion only. Therefore,* in order to illustrate my meaning as perfectly as I can, I have substituted the word Dockage for discount, because discount implies a fair and just arithmetical loss, to make geometricals equivalents without any geometrical spoliation, which nevertheless actually occurs at present against mono-silver countries. Dockage means, usually, a dock charge, but I use the word in the sense of a loss, a tribute, or a toll, paid without any direct compensation in real individual consumer's value, and I recoin the word to express this fact, using Toll and Bounty, also, for a similar purpose. To say that this theory of money is ingenious, is to say that it is sophistry, which is false under any aspect of it: the prevailing Ptolemaic theory is not sophistical, nor is any theory of money sophistical. All the various theories are founded more or less on fact, because it is impossible to have any theory of money that is not supported by some facts for a *certain distance.* The reason is, that the relations of geometricals can only be stated arithmetically, and therefore inversely, magnitudes of quantities being geometrically inverse to arithmetical values of the magnitudes of quantities. The only sense in which ingenuity can be justly imputed to a theory of money, is the ingenuity of looking steadfastly at all the facts relating and co-relating, analyzing, and then synthetically binding them into one theory of many complex sides, which will explain all the mathematically inverse relations which have heretofore been a problem unsolved.

DEFINITION OF MONEY.

Money cannot be defined sharply as a commodity, or a tangible thing of any kind, under the new theory which I offer, and which may well be called the mathematico-metaphysical theory of money.

Money answers a *natural* want, which is that of being able to dispose of a surplus to-day and to get its equivalent at pleasure: the first seller is *credited* with commodities by having buying power, and *excess of buying power* subverts the original idea of money altogether. Two geometrical quantities can be exchanged directly for each other, and the *fundamental* law of *valuable* geometrical exchange, either with or without the intermediation of money, is, that those who have a *valuable* geometrical quantity to exchange, *demand exchange with that quantity*, and no more, *because* they have no more to demand *with*. *Therefore*, if those on the other side of this geometrical exchange, who are also at the same time reciprocally demanding in like manner, carry by the aid of "credits" in the character of purchasing power loaned without due limitation, their geometrical surplus to excess, the longer they are doing so the greater will be the excess, and the *lower* the geometrical fall of their surplus, in the surplus on the other side waiting for exchange. This geometrical disproportion is what goes by the name of overproduction, which cannot exist unless it be complemented on the other side of the exchange, by underproduction; or, in other words, there must for every geometrical + be a corresponding geometrical — on the other side of the exchange. It is impossible to avoid this entirely under any system of production and exchange, but under *direct geometrical exchange or barter*, it would be counteracted quickly by geometrical loss, demonstrated before the eyes of producers *at once*, no matter how great the energy of production. In the next place, it is impossible *for men* to make a *geometrical* term a *third* or *intermediary general* term between two or more geometricals, more especially, if separated. If money were *really* a geometrical *general* term between all geometricals to be exchanged, then no doubt the logical inference would *à priori* be (what *very* logical writers under the present theory of money declare), that there can be no excess of *convertible* bank credits or *convertible* bank notes. But such a geometrical third term is impossible *for the human intellect*, and must, therefore, in point of possibility, be relegated to an infinite or unlimited intelligence, which alone can intellectually relate all quantities to each other geometrically, according to the demand and supply of owners. For *men*, a geometrical third term is impossible: the third term *must* be an arithmetical term, in which geometrical quantity becomes *only* a body and a carrier of the arithmetical term, geometrical quantity in the units which constitute the third term being *intellectually* waived. This law at once *forces* upon the third term and *creates* in it *a mathematical character* as member of *an arithmetical series*, relating the geometricals to be exchanged, to each other, in terms of the units of that series, which thus become the *natural mathematical language*, in which the geometrical relations are expressed, under the name of Dollars, Pounds, etc., while the units themselves *thus associated with their names*, are *re-associated with geometrical quantities severally*, under the name of Price. Hence *naturally* follows an equation of exchange *between* arithmetical units and geometrical quantities, which may by supposition be added into grand totals on each side; the arithmetical side being at the same time first member of an equation and a divisor, and the geometrical side second member of equation and also dividend; the divisor and dividend demonstrating, *as divisor and dividend*, that the arithmetical side has value only *in* the dividend; and hence money can neither be increased nor diminished as a *whole*, arithmetical subtraction being geometrical multiplication, and arithmetical addition, geometrical division. Commodities are thus shown to be the real circulating geometrical values, which *through* money buy all fixed capital, labor, and services, it being impossible to raise *arithmetical* money values *higher than* $\frac{1}{2a}$

of all the geometrical capital of the world. Hence, also, *naturally* and *mathematically*, the units of this series become the units of arithmetical proportions, which are associated *mentally* with all commodities, varying arithmetically and inversely as they vary geometrically, through the forces of production, trade, war, violence, famine, plenty, etc. In this character, they are *bartering units* in the hands of indirect (*not direct*) barterers, which is the *mathematical result or effect of their being used in the equation of exchange.* Barter means the *direct* exchange of 2 geometricals, and indirect barter, as I use the words, the *indirect* exchange of 2 geometricals, by the intervention of arithmeticals. To *limit the series*, becomes thus *an absolute necessity*, and looking *steadfastly at actual facts*, to establish a new science, I affirm that gold and silver are the only, or, rather, the most perfect money for this purpose in the world, *not because* the corporations of money-holders want or need their *intrinsic utility* as individual consumers, *but because* without it silver would be where copper is now, and gold would be the only available material of perfect money. *Intrinsic* utility for individual use, which originates geometrical exchange, is waived *intellectually* by each of the members of the corporations, *whether they know it or not, by logical necessity*, in order to avail themselves of the *higher conventional and corporate arithmetical value*, conferred upon it, in equations, divisors, and bartering proportions. But it is impossible for individual consumers of gold and silver to go *any farther than they do* in *demanding* gold and silver plate, because, as just stated, the more they subtract arithmetically from the silver series or the gold series to make plate, the more they *multiply geometrically* the equation, the dividend, and the proportion value of the remainder. They look to "*intrinsic* value" as individuals, and to "*extrinsic* value" as corporators, and hence they look in one direction as individuals, and in another as corporators. For purposes of *extrinsic* value, the metals are worth vastly more than for purposes of *intrinsic* value, and thus geometrical rise and fall in the small quantities of the metals in bullion is *related entirely to the quantity of buying power* they respectively afford. Gold, although small in bulk and weight, is worth *as dead weight, to embody the unit of purchasing power*, quite as much as silver, with its great bulk and weight, but *no more.* Therefore a geometrical excess of either bullion above the prevailing geometrical par of 15½ : 1, is *exactly* so much *arithmetical excess of buying power, in those places where the metal is used as money*, but under general mono-metalism it is a *slow* business to use this excess of buying power, because its *area is diminished*, but a *quick* business under universal bi-metalism, because its *area is everywhere.* Money is thus a very complex thing. It is a process, a problem, a series, the member of an equation, the member of a proportion, a divisor, a series of paper units used as tokens, each having conventionally geometrical value in commodities, inverse to the arithmetical value of the whole series; a series of gold units of geometrically apportioned weight and construction, each having geometrical value in the same inverse proportion; a series of silver units having like apportionment, construction, and value; a series bi-metallic, the units of which are interchangeable at par, while the units of each metal have like geometrical apportionment, construction, and value; a series, mono-metallic or bi-metallic, with *unbodied* units also in it, having the same value with, or a greater or less value than, the metallic unit of the mono-metallic or bi-metallic series, written on paper or on bank books with metallic or paper units *enough* behind the series to answer every call of buyers, whether those metallic or paper units are *actually handled or not.*

This is my definition now, which I may or may not amend hereafter, but it expresses, perhaps imperfectly, the theory of money I call mine more especially, because no one else has proposed it; and which may be called the mathematico-metaphysical theory of money, as stated in the beginning. To *comprehend* the theory in as few words as possible is the object of the definition, and to prepare the mind of the reader to perceive as clearly as possible the full force of the demonstration as he proceeds. The theory may be called the thorough-base of the science of money. *Utility* is the *cause* of geometrical exchange, and value the two sides of it. Utility and value are nearly related, and thus often confounded. Valuation is the act of the human intellect, and value the logical result of valuation. Whether a thing is worthy of valuation, and therefore of value, is *an intellectual question.* Diamonds, precious stones, velvets, silks, and various other goods, are geometricals worthy of valuation, and possess a high value in other things, *because men have intellectually so resolved as individuals* as it were by common consent, but the field of valuation is limited, and if civilization were to go backwards, intellectual valuation of this kind would fall off, and ultimately stop. The "value" of gold and silver, as money, is something *entirely different.* One half, or nearly one half, of all the geometricals consumed in the world *have no value*, in the sense that they *are not exchanged*, but *used* without exchange. This is the case with money: it is not exchanged for goods, as a *geometrical quantity*, but as an arithmetical intermediary quantity, consumed, or, in other words, used for the purpose of *indirectly exchanging the geometricals.* A bar of gold and a bar of platinum of the same weight are *both* commodities: an owner of the two bars "sells" both on the same day. He *knows* he has sold the platinum, and he *thinks he knows* he has sold the gold, but it is all an illusion as to the gold, and the illusion is aided by the fact that both metals have the shape of a bar; for let the owner ask himself this question, What did I sell the platinum for? and the answer will be, Money. Let him then ask himself, What did I sell the gold bar for? and the answer will be, Money. But the real fact is, that the gold is *uncoined money*, and therefore if he has *really* sold the gold bar, as he *thinks* he has, he has sold *money* for *money*. The platinum was a geometrical quantity, and he sold it for money, and it is *intellectually* perceived *with great clearness* that platinum is a definite geometrical quantity, and money in *some way* an indefinite quantity, although, if metallic, it is undoubtedly a geometrical in weight. He finds on thinking further, that the *only conception* he *can* form of the *gold bar as money*, is so many dollars and cents which are each the unit I with two different names, and *arithmetical values* only, the latter being *abstract terms.* Now let him attempt to sell the unit of I (Dollar) for the 100 units (Cents) of I (Dollar), or, in more general terms, I for I, and he will not succeed in making a sale. Money, whether geometrically gold or arithmetically paper, is *intellectually* an abstract arithmetical, made available between geometricals, to *state the relations of one geometrical at a time*, having practical utility under the various names given it through the *conventional*, *mathematical* value, *corporately* conferred upon it, by its adoption and use; geometrical quantity in money being intellectually and *necessarily* waived, unconsciously, in order to effect the object of relating and exchanging geometrical quantities wanted by consumers. Money cannot be correctly called a commodity under my theory: a commodity is a thing possessing utility for individual consumers, and bought and sold by them, to consume, or, in other words, use. Gold and silver may, under my theory, be called commodities which are being consumed in the process of buying and selling, but are not themselves bought or sold, nor are they bartered for commodities: they are bartered for each other only in the bullion market, while commodities consumed by individual consumers are indirectly bartered for each other *through* the medium of money as an arithmetical quantity.

DEFINITION OF STANDARD IN MONEY.

Intrinsic Value, Rise and Fall, and Standard, are intellectual conceptions. Standard is a measure of geometrical quantities by a fixed geometrical quantity, and as related to money it means the use for this purpose of one metal silver to the exclusion of another metal gold, and *vice versa*, and also the use of two metals silver and gold together in one and the same series, thus furnishing single standard in the first case and double standard in the second case. The double standard is correctly called by *logical* "mono-metalists" an alternate standard. *My definition* of standard, under my theory of money, is as follows: Money being under my theory an abstract, that is to say, a *general* term, geometrical quantity, although absolutely indispensable to make perfect money, is waived unconsciously, by a logical necessity, and logical necessity means the inability of the human intellect to relate geometricals generally to geometricals *through* a geometrical, and therefore it is impossible to found barter exchange upon such a relation. This every man can either settle for himself *à priori*, or he cannot. Whether he can or not, he can demonstrate to himself collaterally the truth of the proposition by the fact that very few people know the weight of coins, and if they learn it they forget it, because they *have no occasion* to remember it as long as government coins for them, while they are compelled all the time to learn and thus *know* the quantities they are buying with money. But if they do not know the weight of a coin, they know very definitely *its name*. Therefore the only idea presented to their minds by money is I (Dollar), I (Dime), I (Cent), I (Pound), I (Shilling), I (Franc), I (Centime), etc. If this demonstration is not satisfactory one can complete it, by ascertaining the fact, that the use or consumption of gold and silver by individual consumers, and the use or consumption of the same metals as money by the corporate body of buyers and sellers, face as it were in two opposite directions, by a mathematical necessity. Consumers of silver plate would, *as individuals*, be glad to consume more if they could buy it cheap enough, but they *cannot* buy it cheap enough, although consumers of silver as money, or certainly a large portion of them in highly civilized countries, would, *as a body*, gladly give away ¾ of it or more *for nothing*, to consumers of plate, if it were *mathematically* possible. To do so is mathematically impossible, as long as silver continues to be *full token* money in the world. If the demonstration mentally car ried to this point, is not enough, let one reflect that prices are general, or mathematical, in other and more special words arithmetical, expressions of the relations through potential exchange of geometrical quantities, as those relations vary from time to time, and that the payment of money after fixation of price for the purposes of exchange, is the conventional delivery of the intermedial units in a tangible form for the corporate purpose of affecting geometrical exchange; tangible geometrical quantity being thus naturally and necessarily made the co-efficient of arithmetical or intangible, abstract quantity, in exchanging geometrical quantities wanted by consumers.

Therefore, under my theory there is no intrinsically valuable commodity (geometrical quantity) standard of the values of commodities. Such a standard is unthinkable: a standard in the sense of I standing alone is unthinkable; a standard between geometricals in the character of I + I is also unthinkable, because each geometrical has I; but a standard in the sense of I + I + I is entirely thinkable. I has no relations, I + I shows only relations of equality between two geometricals, because one of the geometricals demands I and the other demands I, which gives a relation of only I to I, and thus leaves exchange as badly off as before. To I + I we must add I more, to state difference of relation. Three units are therefore indispensable in the shortest arithmetical monetary series. Gold and silver as money are arithmeticals constituting the third term, of which 2 geometricals are the first and the second, but they are also geometrical quantities very desirable, and of high utility. They are produced like other metals, and vary in quantity produced and carried to market, and in quantity taken out of money use and out of plate use and carried to market. They are thus subject to geometrical variation of quantity in market, but they have no geometrical market save each other, and thus the metal which happens to be geometrically in excess above the geometrical par which results from monetary apportionment of weight to the unit of each metal, rises geometrically while the other falls geometrically. But one metal is always the equivalent of the other in bullion, as *geometrical quantity distinguished* from *arithmetical* quantity, which is money. Therefore we have a very complex mathematical result in bullion exchange, instead of a simple bullion exchange of two geometricals *only ;* for we have a geometrical *exchange* + an arithmetical or money exchange, inverse to actual geometrical rise and fall in quantity. Keen-eyed brokers and bankers have always availed themselves of this inversely mathematical opportunity of *making money.* When gold "fell" inversely in bullion after the discoveries of California and Australia, it was profitable to pile up silver coin *as bullion* and take *out* gold to use arithmetically as money in its place, and the profit would have been something of great importance, if the mathematical (arithmetical) opportunity had not been inversely and unintentionally counteracted by the geometrical fall of gold in bullion, caused by the very fact of piling up silver geometrically in bullion, by taking it arithmetically out of circulation. For every dollar or pound of gold taken out of bullion, and coined and carried into money, gold bullion was made geometrically short by 1 dollar or 1 pound in weight of its bullion in market, and the money gold in circulation was made arithmetically long by 1 dollar or 1 pound. As gold thus *fell* geometrically in bullion, it rose arithmetically jointly with silver, out of bullion, as money, but this process would have been *comparatively* slow without silver, and therefore a large profit could have been made, had not the operators been *compelled* to take 15½ pounds of silver *out of* circulation for every pound of gold they carried *into* circulation; and thus for every pound of gold they took out of bullion, they made gold fall two pounds geometrically in bullion. The geometrical fall through taking out 1 pound of gold, was — 1 pound of gold, and the geometrical rise of silver through carrying 15½ pounds of it into bullion was + 15½ pounds of silver, the geometrical + of silver being the equivalent of the geometrical — of gold. If there were 50 millions in bullion of which 26 millions was gold and 24 millions silver, the total purchasing power was 50 millions, and gold had in bullion potentially 2 millions more of it than silver, although the 26 millions gold was geometrically worth the 24 millions of silver only. Hence came the money (arithmetical) profit resulting from the inverse geometrical exchange, of which shrewd brokers and bankers, who knew what they were about, availed themselves when they could, but they could not *mathematically* give an account of the way they made the profit. They made their profit by putting silver in and piling it up geometrically, and taking out gold in its place arithmetically, thus putting silver money into bullion, and taking gold money out of bullion; money or arithmetical value, being then as now the highest, and not only the highest, but the only available value. They called it then a fall of gold as they call it now a fall of silver, whereas, in point of fact, if there are 116 millions of gold and silver in bullion, of which 50 millions are gold and 66 millions silver, the 50 millions gold is *geometrically worth* the 66 millions of silver, but the silver, as silver money, is *inversely and arithmetically* worth 16 millions more than the gold as gold money. The area of gold is directly limited now to one half the area it had then, say + 8 per cent. and silver is now limited directly to one half — 8 per cent., but at that time, *through* bi-metallic France and her allies, gold and silver had, in respect to the *comparatively small quantities in bullion*, and thus virtually for *all purposes of needed exchange* as to all the world, the area of the world. The geometrical movements of silver in bullion downwards, and of gold upwards (in quantities), are slow now, but certain. If the 16 millions extra silver in bullion *could* be used arithmetically as buying power *at once* in mono-silver countries, by being *at once* carried out of bullion, silver would "rise" arithmetically 16 millions in money, and fall geometrically 16 millions in bullion, to the great loss of the adventurers, who could only pay it out in a few places, and thus let it *gradually* distribute itself. The movement of silver is therefore necessarily slow at this time. The "*alternate standard*," so called, is thus shown to be only an alternation of the inverse arithmetical profit from gold to silver and silver to gold, out of every geometrical rise and fall of bullion, the profit being sometimes on the silver and sometimes on the gold side. The *alternation* is against silver geometrically — 16 per cent. now, and in its favor arithmetically + 16 per cent.; and sooner or later — and + will change sides. The only standard, then, under my theory is *abstract units*, arithmetically limited at *some point* beyond 3, in which the exchange values of geometricals are stated, and, by means of exchange, "measured."

A clear idea of what is *meant* by standard under the Ptolemaic system of monetary science still prevailing is important for the reader, in order to contrast it with my idea of what a standard *really is.* The idea of the clearest and most logical writers seems to be that a metallic standard of value is the quantity of gold or silver given in exchange for some other commodity, and that where both metals are current and one "falls in value" in bullion, the latter becomes a depreciated standard, so to speak, until it rises, and the latter falls, when the latter becomes the standard, each alternately becoming standard, and forming an alternate, or what, as it seems to me might be called, more properly, to insure rigorous accuracy, an alternating standard: if this theory is true, bi-metalism, so called, is utterly absurd, and has no logical standing place. Suppose silver to be discarded everywhere and gold alone used for general purposes, silver being used for subordinate purposes only, as in England. Every purchase is resolvable into so much commodity gold on one side, for so much commodity of another kind on the other side. Even if "bank credits" or paper money be actually given instead of gold, the quantity of gold they are worth can always be found, and therefore it seems to me most correct, under this theory, to maintain that a bank actually deals in a commodity gold. Even if the credits and paper money are inconvertible, their convertible value *can be found* by premium. Gold is, *in this sense*, an *apparent* measure of values of commodities, because every commodity bought is the equivalent in exchange, either actually or convertibly, of a certain amount of gold. The illusion here is, that geometrical quantities of various kinds of utility, shape, size, and extension can be related to each other *one at a time*, by some standard geometrical quantity as an intermediary, or, in rigorously exact terms, that the intellectual act of relating *one* member of a very complex geometrical series of commodities of various degrees of utility, indefinitely to any one of, and to all, the others can take place by means of another geometrical series constructed out of portions of one commodity gold, or one commodity silver, whereas it is intellectually, or, in other words, metaphysically, impossible. But there is, *not* in the *apparent* (Ptolemaic) sense, but in a *mathematical* sense, a standard in gold as a measure of a certain kind. We may call weight in gold a standard of the length to which the particular weight of any gold coin will carry, an arithmetical monetary series each member of which is weighted with that particular weight of gold and related to a geometrical series of consumable commodities as an intermediary, for the purpose of buying and selling them. Standard weight demonstrates up to and beyond the $\frac{1}{100}$ of a pennyweight of fine gold, the value of the unit it carries, relatively to the unit of any and every other series. In this mathematical sense only is weight a standard: in the apparent (Ptolemaic) sense, it has no actual existence, being intellectually waived, so to speak, by buyers and sellers, because their intellectual faculty does not extend far enough to see any relation *for them*, between a standard weight of gold and any and every commodity they want, even admitting such a relation to exist. Even 2 purely geometrical quantities, without any intrinsic value, like pyramid and cylinder , cannot be related generally even when side by side before the corporeal eyes, except by the units of an *arithmetical* series, not less than 1 + 1 + 1; and how then is it intellectually possible to relate all the commodities of the world with all their varying intrinsic qualities, by a *geometrical* series of metallic quantities, except in one way? That one way is the intellectual conversion of the intermedial geometrical series into an arithmetical series, for the purpose of relating the members of the geometrical series of consumers one to another, by the action and reaction of numerous buyers and sellers; the finite limit of intellectual power naturally converting, as it were, the geometrical series into an arithmetical series, leaving weight exactly what it ought to be, to meet the great remaining want of a purely arithmetical (say paper money) series. That want is the want of a definite limit by the most perfect fixation possible, of the arithmetical series employed to effect the relation and exchange of commodities. This want is met by metallic weight, as a standard co-efficient in limiting the arithmetical series at a fixed point, and as a standard co-efficient of the unit, in fixing its geometrical value in exchange for commodities all over the world, whether it carries a government stamp and geometrical construction, or not.

CHAPTER I.

THE COMMON SENSE OF MONEY.

THE changes of late years in the bullion markets of the world, have given rise to various plans for the rectification of " the exchanges " between mono-gold and mono-silver countries, but they contradict each other more or less; and hence, either all of them are false because not founded on a theory supported by facts, or some one of them is true because it is founded on a theory supported by facts, and the remainder are false, because they are not so founded. It is impossible to have a true theory or science of money unless it be founded on *real* facts, and if theories contradict each other and at the same time universally known and admitted facts, the presumption is, not indeed that they are founded upon such facts as make the baseless fabric of a vision, but upon apparent facts which have the semblance of real facts in the eyes of those who are wide-awake, and in full possession of their faculties.

Adam Smith affirmed the cost of everything to be the toil and trouble of acquiring it. In the character of a result effected by forces in operation and in a qualified sense, this is true, but there is a vast difference in the cost, that is to say in the amount of toil and trouble which things of the same kind and quantity cost different individuals, before they are obtained. He says, further, that labor is the real measure of the exchangeable value of all commodities, and that gold and silver as money are commodities, or, in other words, merchandise, bartered as a general equivalent for other commodities. But what is the exchangeable value of a commodity? It is that value for which the commodity will exchange, and that value may be toil and trouble, in other words, labor, or it may be another commodity; and, in the later case, it is the quantity of another commodity, for which a given quantity of the commodity will exchange; or, in other words, the quantity on one side, which quantity on another side avails to procure. But why does quantity avail to procure quantity? Solely because each quantity possesses qualities of utility. Value, then, is a compound in the case of commodities, consisting of two elements, quantity and quality. But quantities are limited, both as a whole and parts of a whole: in other words, they are limited, generally and particularly. Exchanges of commodities are limited by the total of commodities, and the exchange value, in other words quantity of commodities, in general procurable by any commodity, as a whole, is limited (in other words measured) by the grand total of all commodities other than itself. Value means quantity and quality, but in exchanges quantity without quality is an abstraction, and such also is quality without quantity; and an accurate perception of qualities in some goods requires acute and experienced buyers. The *real* measure, then, consists of the limitation of production in each particular quarter, by production in all other quarters. Buyers are not only willing but anxious to get all the quantity they can of every commodity out of which they buy with their money, but sellers are limited by the quantity they have to sell; and hence, if some sellers sell all they have to sell, and others accumulate stock, because, while they cannot sell it all at current prices, they are enabled to hold a large surplus by means of their own capital, or loans, or both, the surplus, when thrown on the market, must necessarily fall as much below average as it has been held above average. In other words, producers are at work all the time upon their own products, and while so at work, consume, upon the average, nearly all there is to be sold, of other products, personally or representatively. If any one product has a large surplus, that product is not only in excess of average in point of quantity, but other products are equally in defect of average in point of quantity, as respects the product in excess; and the surplus, when it falls upon the market of consumers for what it will bring, because it can no longer be kept out of it, adds nothing to the quantities of other commodities for which the total quantity of the commodity would have exchanged without any excess; and therefore to every unit measure of its quantity, in all exchanges, must be added surplus divided by the total of such measured units existing, had there been no excess. The producers of the surplus have, chiefly by borrowing, been enabled to consume other products, and thus reduce their respective quantities, as much as they have increased the quantity of their own products. The true meaning of overproduction therefore is, that in certain quarters of the field there is a large surplus, while in other parts there is not only no surplus, but, on the contrary, there is defect. Dividing commodities into two grand sections, beginning with the staples which are necessaries in the highest degree, and ending with those which are necessaries in the lowest degree, in other words, luxuries, stopping half-way to make the division, the producers of the last half who have created the surplus, hold a part of it themselves, but have, by sales for borrowed money, disposed of, say, three quarters of it to other producers, while the latter, and those who bought of them with borrowed money, hold the remainder. During the years in which the surplus has been accumulating, these producers have been supported by drafts with the aid of borrowed money chiefly, to the debit of their own production, upon production in the first half of the grand total of commodities. The necessaries of life not only may have been, but must have been, abundant in order to be able to honor such drafts.

The United States have, within the last ten years, sent abroad vast quantities of staples, but while doing so, could show railroads which cost $30,000 per mile sold for less than $15,000 per mile, although they had raised the value of lands prospectively in part, and in part actually, by more than twice their cost. At the same time the United States could show brigades of tramps (now a household word), of whom a large portion, inferior workmen by comparison, had left the very forges and shops in which a considerable part of the iron rails upon these roads had been manufactured. At the same time the United States could also show invoices of prints sent abroad and sold in the great centres of English production: in Manchester, Leeds, and other places. These were some of the odds and ends, so to speak; the remnants of overproduction, in the rigorously exact meaning of the word, as above defined. They were actually offered and actually sold at prices as much below average as the cost of producing them had been carried above average. Railroad iron was not sent abroad at all, and there was only enough of remnants of prints to frighten some people in England to talk about stopping such adventures by a tariff. At the same time the United States could show men worth, each, from fifty to a hundred millions of dollars accumulated by means of a compound capital, the chief elements of which were great abilities and good fortune. Each had accumulated his millions out of the grand railroad lottery, and the prizes were distributed through the banks. Such energy of production and such progress as the United

States have shown for the last fifteen years are unparalleled, except perhaps in the case of Great Britain during the first twenty-five years of the present century. Such rapid progress tends to throw great masses of wealth into single hands, in contradistinction to a comparatively slow but sure progress, like that of France.

Whether it is possible to arrest it by equalizing its movement, and, if possible, whether the arrest ought to be made, I do not intend to argue here.

My object in referring to it in this place is, to illustrate the true "measure," or, correctly speaking, limitation of "values," by an appeal to facts. Labor is a source of supply and not a measure of values; in other words, of quantities and qualities. Energy of production, as it is greater or less, determines, subject to the limitations of time, space, force, and total quantity, the total of production; and the limit (not only the possible, but the actual limit) of production in all quarters but one, is itself the limit of the total of production in that one quarter. This is the only "measure" of values, that is to say, quantities and qualities, in a theory of production *founded on facts.* But it is impossible to have any correct theory of production generally supported by the scientific world, and by writers upon political economy and social science, unless there be a correct theory of money; a theory which does not contradict itself. If the word "value" is the evidence recorded in language itself, of so many illusions and mistakes, it is quite possible, if not probable, that the words relating to money may furnish like evidence. If all the attempted solutions of the "exchanges" between mono-gold and mono-silver countries contradict each other and at the same time known facts; if the theories of mono-metalism and bi-metalism, of banking, paper money, bank credits and debits, contradict each other and well known facts at the same time, it is certainly high time of day to apply the test of rigorous analysis, to find out and bring to the light the actual facts, and establish a science founded upon these facts, in place of the present, founded on apparent facts. All the plans of solving the "exchange" problem between mono-gold and mono-silver countries, are founded upon the almost universal belief that gold and silver are, when used as money, bartered, sold, or purchased as commodities, or, in other words, merchandise; and that at the same time they are sold, purchased, or bartered just as one chooses to call it, when they are bartered for each other as bullion, or sold as manufactured commodities in the shops of jewelers, watch-makers, and plate-makers. This is the *apparent* fact, but it is an illusory and not a real fact. We have in the English language but one word, which by implication contradicts the illusory fact and affirms the real fact, and that worn is *token.* All money is in reality token money in one or another sense. All paper money is token money; the silver now in circulation in the United States is token money in the prevailing sense, and if the

United States do not in season stop coining silver, it will in time drive out gold and become token money in another sense; that is to say, in the same sense in which silver is token money in mono-silver countries, and gold is token money in mono-gold countries.

If gold and silver as money are articles of merchandise in the same sense with the articles of merchandise for which they exchange, this general fact (theory) ought not to contradict other known and generally admitted facts: if it contradicts such facts in many instances, it cannot be true, and then the question will arise, What theory will support and explain all the facts? I affirm that the theory that money is an article of merchandise contradicts many known and undeniable facts, and that the only theory which supports and explains all the facts is, that money of all kinds, including paper and metal, is an arithmetical series, of which units of exact metallic weight geometrically proportioned to the whole mass, and to each other, intrinsic qualities of the weight excluded (perfect token money); units of both exact and inexact weight under limited coinage not so proportioned, intrinsic qualities of the weight also excluded; and units of paper money (the latter two imperfect token money), are members. The money of the world may be regarded as composed of many series of different lengths, but they are all resolvable into each other, and all into one, by means of purchases and sales, bills of exchange, checks, and drafts. If one series has 50 per cent. more units than another, the units of the latter owe the units of the former an arithmetical debt of 50 per cent., which is paid by selling goods bought with units of the second series, for units of the first series. The units of the first series will then owe a geometrical debt of 33⅓ per cent. to the units of the second series, with which the goods were originally purchased before they were removed, or, in other words, exported, which geometrical debt will be paid by a purchase in the country of the first series, and an importation and sale in the country of the second series.

If bills of exchange are drawn, the bill drawn in the country of the second series is geometrically debited (discount) 33⅓ per cent., and therefore receives 33⅓ per cent. less units than it calls for, itself, and the bill drawn in the country of the first series is arithmetically credited (premium) 50 per cent. Rigorously exact weight of metal in trade between different countries is essential, not because the gold and silver employed in paying international debts, or trade balances, as they are called, are merchandise, as maintained by the Mercantile Theory of money, but because weight is the token, in other words the co-efficient of the unit, in finding its place in any series, and thus enabling it to maintain its geometrical value. The value of the metallic unit, in other words, depends, first, upon the length (counting paper as well as metal, and allowing for discount and premium) of the arithmetical series of which it is a member, and second, upon the length to which it would carry a series composed of units of all its metal found in the shape of money, of exactly the same weight with itself. Divide all the commodities for sale in a country into one thousand million parts, and issue for one half, or five hundred millions, paper tickets called Dollars, and five hundred millions of gold and silver tickets called Dollars, of a certain weight, and each ticket occupies the same place in the arithmetical series and has the same geometrical value: geometrical value, or, in other words, money value, does, not lie in the metal of which the metallic ticket, or metallic bill of exchange payable to bearer, to use Adam Smith's simile, is made, but in the documentary evidence, so to speak; in the geometrically proportioned right which the possession of the localized metallic or paper unit indifferently affords; and which is universally admitted and acted upon by every member of the corporate body of sellers of commodities, who are at the same time buyers of commodities and money holders. To call the tickets bartered commodities, is to confound commodities with the tickets, tokens, or bills which distribute them; a process, with the materials employed in working it.

Let us now test the commodity theory by actual as well as assumed facts or cases. Adam Smith says, in his Wealth of Nations, page 330, fourth London edition, by A. Murray, "It would be too ridiculous to go about seriously to prove that wealth does not consist in money, or in gold and silver, but in what money purchases, and is value only for purchasing." If commodity value is quantity and quality, and the quantity and quality of the gold of a sovereign are nothing to buyers and sellers except to enable them to procure other quantities and qualities, then Smith, instead of speaking figuratively, as he undoubtedly supposed himself to do, when he compared money to a bill of exchange, stated matter of fact, and when he affirmed metallic money to be a commodity worth the toil and trouble it cost to acquire it, he affirmed what seemed to him to be fact, but was not fact. In like manner, Mr. Bonamy Price (Principles of Currency, page 190) says "it follows irresistibly that this bullion, not being consumable wealth nor capital, is practically and substantially not wealth at all, and forms no more a portion of the nation's riches than the fertility of a field which is never cultivated." This language is very clear and emphatic, after the usual manner of Mr. Price, but if he is right here, he is wrong in saying that commodities are bartered for gold as commodity; that double barter has succeeded to, or, in other words, taken the place of, single barter; and that a bank deals in credit or debt.

Again, Mr. Price says that in exchanges "the cost price of the goods is compared with the cost price of gold." This is impossible, because not one buyer or seller in a thousand, and probably not one in ten thousand in England, or elsewhere, knows the quantity (weight) of the sovereign which he lays out in goods: he does not know it because he has no occasion, and is not compelled to know it. If there were no public mints, and no private mints in which he had entire confidence, he would be required to know it, because he would be compelled to weigh his gold and to be very exact in his weight; but because he does not want his gold as an individual consumer, and has full faith in government certification, he makes no inquiry about weight, and keeps no scales to weigh his gold. But if only one man in ten thousand, or even one in one thousand, knows the weight of a sovereign, it is impossible for the nine hundred and ninety-nine to make any comparison of the cost price of the gold in a sovereign they pay or receive for goods, with the cost price of the goods: the gold is therefore quantity (weight) without quality, or, in other words, without "intrinsic value," and its cost is either other quantity *plus* quality, or labor, which is, in other words, toil and trouble. The whole question, according to Mr. Price, is one of proportion *mentally* formed and stated by all buyers and sellers; but if nine hundred and ninety-nine out of every thousand of buyers and sellers are ignorant of the quantity (gold) on one side, or, in other words, one member of the proportion, it is utterly impossible for them to compare it with quantity on the other side which they know exactly. They know the quantity of goods, but they do not know the quantity of gold. There is but one theory which explains this fact, and that is the theory that the value of the gold sovereign is not that of a commodity, but of a unit.

whose geometrical value as a token, in commodities at large, is proportioned to the length of the arithmetical series of which it is a member.

M. J. B. Say and other eminent economists reject labor as a measure of value, — and herein, in my opinion, they are less logical than Adam Smith and Mr. Price, — but with people in general, including Adam Smith and Mr. Price, they call metallic money a commodity or article of merchandise, rising and falling, and bartered like other merchandise. Let us test that theory by facts. M. Say declares, in his great work on Political Economy, chap. XXI., sect. 9, entitled, Of money as it ought to be, that a government ought not to give a name, like franc for instance, to a coin, but merely to stamp, and thus certify, the weight, because, were that rule adopted and followed universally, it would be impossible to adulterate, or, in other words, debase, coins, and every bargain would be a barter of one substantial commodity for another. The illusion of a commodity value in money was so overpowering to the eyes of the understanding of this great writer, that he overlooked the fact that the names of the Roman, the French, the English, and perhaps all or nearly all coins were at first units of weight, and yet they had been repeatedly debased. He says the only idea presented to the mind by the word *franc* is that of the five *grammes* of silver it contains. But this assertion is contrary to fact, not only for the reason before given in the case of gold, but for the further reason that a large portion of the whole corporate body of money holders in the West would be glad to get rid of three fourths or more of the metal in every silver coin for nothing, if it were possible to do so, while each one of the whole body of individual consumers of silver would be glad to get it at a price he could afford to pay for it. The wishes and views of the whole body of money holders and consumers of silver harmonize, but it is utterly impossible to carry them out without prejudice to the geometrical value of the silver unit in commodities at large by elongation of the series, through loss of weight, and loss of its proportion to the unit of gold. It would be impossible for weight, which a man regards as a nuisance, to be precious to him, even if he always used scales to find it: it is not the weight that is precious as such, but its power as a unit, of buying everything for sale in a greater or less geometrical proportion (a power existing equally in the paper unit of like geometrical value): and if geometrical value could be maintained, loss of weight in the silver unit to the contrary notwithstanding, every western buyer and seller would be glad to part with it. Retention of weight is essential, not for its own sake, but because it cannot be forced in greater quantity upon consumers, and the loss would therefore go into other coin and so merely lengthen out the grand arithmetical series, causing every unit, whether of silver, gold, or paper, to lose geometrical value in proportion. The illusion of commodity value would be harmless if it merely served to round out a theory for universities, colleges, and schools, and men outside of practical life; it is injurious because the illusion itself begins with practical life, and is rounded out into theories more or less logical, by professors, teachers, and writers, and thus reacts injuriously upon practical life; and if a true theory is destined at some future time to prevail, it must be first adopted by men of science, taught as such, and gradually introduced into practice. Mr. Price, who may be regarded as one of the most logical writers of recent or any time upon the subject of money, has, *if my theory is true*, demonstrated the theory that money has commodity value to be false, by a *reductio ad absurdum*, without intending it. Monetary statistics show that less than half of one per cent. of payments made by banks is in metal actually delivered, but banks keep more than twenty times the amount actually needed to supply this "demand," or, in other words, customers who require actual deliveries of gold demand less than half of one per cent. in gold out of all payments made by banks, and, upon the average, banks, in *point of fact*, whether they know it or not, actually keep more than twenty times that amount.

But one half of one per cent. with a reasonable margin is enough to keep if the commodity theory be true, because it *supplies the demand;* and hence the corollary of Mr. Price, that ever since 1819, bullion not being consumable wealth nor capital, the supply of gold in England has always been in excess of this demand for use. This is rigorously correct reasoning from that part of the double premiss which by implication affirms that gold sovereigns are, as money, commodities and subjects of barter; but the illusion of commodity value is so strong that it blinds the eyes of the understanding of this able reasoner to the fact that that part of his premiss is contradicted by another part, which affirms that sovereigns are not consumable wealth.

Therefore, to show the truth of my assertion, that we have here a *reductio ad absurdum* of the commodity theory of money, it is necessary to test it finally by facts, and meantime to assume that this part of the premiss, — that sovereigns are not consumable wealth, — which contradicts the other part, is out of the way; and then we have the rigorously correct conclusion above given, that one half of one per cent. in gold with the necessary stock for fluctuations is enough, because the statistics quoted demonstrate that one half of one per cent. is all that is called for. But what are the facts? The facts are, as Mr. Price himself asserts, that the import of gold is hailed with satisfaction by merchants and bankers, because money will, in consequence, be easier and discounts more plenty, and the contrary when it is exported; and it is a well known fact that such is always the case. Nevertheless *it ought not to be the fact*, if one half of one per cent. or even ten times that amount, is enough to keep on hand: if it goes at once into the bank cellars, and perhaps never actually comes to the light again for years, because there is already more than enough to meet the calls of customers who demand it, and cause it to be actually brought into the light and carried away, it cannot possibly have any just influence upon loans. The bank is quite as able to supply the demand for gold, without this surplus which is coming in to-day, and in spite of the surplus which will be going out to-morrow, because it has a substitute which is indefinitely called credit from the customer's side of the counter, and debt from the bank side of the counter. Therefore the admitted fact that discounts are plentier, money easier, and bank rates of interest lower, when gold is coming in, and the contrary when it is going out, is a fact which *ought not to exist*, if the theory, which all bankers and merchants, so far as they have any theory at all, believe in, — that gold coin as money is bartered as a commodity, and that banks, to the extent of 99½ per cent., deal in a substitute for that commodity, called credit on one side of the counter and debt on the other, — be true.

It is a fact, nevertheless, always and everywhere, and yet an able writer and logician demonstrates that either fact or theory must give way; and because fact is fact in spite of all theories, we have here a *practical reductio ad absurdum* of the premiss from which Mr. Price and all the bankers and merchants start. The real difference between him and them is, that he is rigorously logical and consistent, and they do not care for logic or consistency, having no occasion to learn either for the most part. They do not dispute the premiss, but, on the contrary, if they have any ideas or theories whatever, admit it; nevertheless, in spite of theories, they are compelled in commercial and banking affairs to regard facts. The theory that banks ought to "sell off" all their gold, except one half of one per cent. of total deposits, and a reasonable margin over and above it, which I will assume to be three times that amount, or a ratio of 1½ per cent., is the sound and therefore practical theory, which logically follows from the theory that money has commodity, in other words a mercantile, and in still other words, a barter value. But where is the banker in any part of the world who will maintain that the ratio of banking "reserve" to the total of bank debt *could* be kept as low as 1½ per cent., even if the whole community of bankers combined to "sell" it off as fast as they could, and to keep on "selling" it off, at the best rates they could get? It would be impossible, *because* money *cannot be sold*, and the supposed rise and fall of gold, as money, is illusory. It would be impossible to keep gold in so small a ratio to loans, as long as it is the "standard" money of England. All over the world where gold is the standard, and the "basis" of loans, its movements *show*, but do not themselves *make*, money easy, or the contrary.

The theory which supports, and is supported by, these facts, is, not that money is an article of merchandise, like the merchandise it distributes, but a metallic, paper, or credit and debit unit, with more or less gold or paper behind it, weight of metal in the metallic unit of gold or silver, under free and unlimited coinage, being a co-efficient of the unit, in finding its place in every arithmetical monetary series composed wholly or partially of units of either metal, under general bi-metalism, or one metal under mono-metalism; and at the same time a co-efficient of all monetary units in limiting, fixing, and keeping steady the number of units in any and every monetary series of the world; thus helping to keep steady by its weight the geometrical value of each unit by *limiting* arithmetical extension.

The movements of gold, therefore, are not important in and of themselves as an active cause, that is to say, not in a commodity or mercantile sense; but because they *result* from the buying and selling going on throughout those parts of the world having national and international commerce. Sales for cash borrowed out of banks impair the average geometrical relations of quantities of commodities, *for sale for cash borrowed*, with quantities of commodities actually sold for cash not borrowed. Sales already made for cash borrowed, and the power of borrowing, to cause still more sales to be made for cash borrowed, diminish arithmetically the number of metallic units limited in number by metallic weight, as a co-efficient in maintaining limitation, and increase arithmetically the number of units of "credits" which are in excess of the metallic units, thus limiting the latter by the former, instead of the former by the latter. Sales for cash borrowed from banks subtract metallic units from the total of bank reserve, or add units to the total of units of bank debt, while sales for cash not borrowed add metallic units to the reserve, and so far approximate towards metallic limitation of the units, in the series composed of total bank debt, over and above total reserve taken as a whole; or effect the same object by subtracting from the units of total bank debt in excess of total metallic units. The metallic units lose by subtraction always when gold is actually "drained" out and gain by addition when it is drained in. The movement of gold into the reserve has the same effect in making "money easier" as payment, and therefore subtraction, of mercantile debt due banks and deposit debt due depositors, by means of a check, covered by a bank credit which the drawer owns, and did not borrow. The inward movement of gold is of no paramount importance as a *cause*, but as the *result* of sales for cash not borrowed, which tends towards the restoration of average geometrical proportion between commodities produced and for sale; in other words, equilibrium; and the outward movement of gold is of no importance as a cause, but as the result of sales for cash borrowed, tending the other way so far as, by mercantile charges, interest, freight, insurance, taxes, etc., they add to the total of bank debt, over and above the total of bank reserve; or diminish the total of bank reserve, as compared with the total of bank debt; for banks deal in their "reserve," and not in their own debt; their debt over and above reserve is only the registered movement of the reserve itself, as it loses limitation by relative loss, and recovers it by relative gain, as compared with debt. Hence, instead of trying to keep less reserve, the problem to be solved, whenever, if ever, true monetary science is generally established and taught, will be, not to sell off the gold, or gold and silver under general bi-metalism, but to keep gold and silver in every bank, in as even a ratio as possible to bank debt, without any reference to the question as to how much gold and silver is paid over the counter for retail trade, or weighed and delivered for international trade. Arithmetical limitation, in order to help maintain geometrical values, being the end actually, although unconsciously, sought by bankers in maintaining their reserves, in spite of all theories to the contrary, the actual handling of gold is an unimportant part of the process, so far as the grand objective point is concerned, and under general bi-metalism it will be very desirable to use metal without handling it, and to confine the actual movement to gold *only*, as far as possible internationally, throughout the West.

In order to establish true science for practical purposes, it must first be clearly perceived and taught, that gold and silver have three different kinds of value; in other words, three relations of quantity: first, barter value in bullion exchange; second, mercantile value as commodities or merchandise, when made into plate and jewelry; and third, geometrical value, as monetary units, tickets, or tokens, in a monetary arithmetical series. Their barter value has no *direct* relation, either to their mercantile or geometrical value. Being bartered for each other, and for each other only, the only quantity of gold for which the quantity of silver in the bullion market can be bartered, is the quantity of gold bullion in the market; and the only quantity of silver for which the quantity of gold can be bartered, is the quantity of silver in the market. The barter being confined to these two commodities, the lesser quantity of one is always worth the greater quantity of the other, and *vice versa;* intrinsic consideration, or, in other words, "intrinsic" value, enters not into this exchange any more than into the geometrical value of money. Where there are but two commodities to be exchanged, the total of one must always be worth the total of the other, no matter how much either may vary, unless a part of the total of one *while actually in the* market is not exchanged, because the price asked cannot be obtained, which is not the case with gold and silver. In the purchase of gold and silver commodities, like plate and jewelry, on the other hand, intrinsic consideration enters largely, and *therefore* the commodity proportions of quantities in the bullion market have been changed from, say 40 of silver to 1 of gold, to nearly 15½ of silver to 1 of gold, independently of the fact that coinage has for the most part been confined to the geometrical proportion of 15½ and 1, these weights being geometrical equivalents under bi-metalism. Instead of 1 ounce of silver being the equivalent of $\frac{1}{40}$ of an ounce of gold in the opinion of consumers, 1 ounce is worth in their opinion $\frac{1}{15\frac{1}{2}}$ or $\frac{2}{31}$ of an ounce of gold for commodity, or consumers' uses. Silver is inconveniently bulky and heavy for monetary use, to actually handle and move — at least in the opinion of Western money-holders; but it cannot be made lighter, by throwing a part on consumers' markets. Its geometrical value as a unit, compared with that of gold, increases in geometrical proportion, inversely as the total mass of silver in coin diminishes relatively to the total mass of gold in coin, and the geometrical value of the unit of gold diminishes in like proportion, as compared with that of silver. If all the gold and silver produced went into coin in the proportion of 40 silver to 1 gold, the units of silver and gold being always forced and compelled, so to speak, to maintain some certain geometrical proportion to each other, and no other certain, steady, proportion than that of 40 : 1 being possible, it could be adopted and maintained more or less perfectly. Such an enormous mass of silver would probably relegate it to a place like that of copper, but if coined in geometrical proportion by weight, its total weight would furnish 40 times the number of units that of gold could, and could therefore make an arithmetical series 40 times as long as that of gold; and hence the geometrical value in commodities of its unit of weight would, under any and all circumstances, be as 1 to 40 of gold of like weight, as long as they circulated in company.

This geometrical value has increased through consumers' demand, and the greater chemical and accidental losses, and losses by abrasion, etc., to which silver is subjected, by reason of its greater bulk and weight, than gold, and fixation of weight in coinage, to 15½, for the most part, until it is now, on the average, 15½ : 1, accidents of demonetization excepted. Its geometrical value as money has thus increased so enormously, by subtracting from its weight, and hence *indirectly* from the number of units it can furnish, that it cannot be much farther increased without increasing that of gold in nearly equal proportion. Monetary use and individual commodity use are thus inverse to each other; one moves in one direction, and the other in another direction. For commodity use, the mass of silver cannot be too great; for monetary use, its mass is not only too great, but it has been increased by the illusion that monetary value is commodity exchange value, and hence the inference that there can be such a thing as economy in the use of, or rise and fall (in a mercantile sense) in, geometrically proportioned units of weight, coined like those of gold and silver. If there were no paper money, or, rather, if the use of paper money were impossible, if a steady arithmetical proportion between the units of total bank debt and total bank reserve were always maintained, and bi-metalism at 15½ and 1, or even 15 and 1, established universally, there would really be but one monetary series in the world. The series would be very much shortened when relieved of the elongation caused by paper and various degrees of "economy" in banking reserve, and it might, by slow and gradual elongation, through recoinages taking a little each time (each recoinage) from the unit of each metal, in the exact proportion of 15½ and 1, be very slowly extended, and finally stop, leaving the series to be maintained thereafter, arithmetically, by metallic production, as might well be the case, because the silver unit would be reduced in weight, say 33⅓ per cent, and the gold unit also 33⅓ per cent, still retaining, nevertheless, the geometrical proportion by weight of 15½ and 1. But the illusion of commodity value has shown, and still shows, its effects in other particulars. All governments have debased, or, in M. J. B. Say's words, adulterated, their coins. The illusion of commodity value was so strong in his eyes that he supposed an adulteration by loss of metal in a coin, say the *livre*, of ⅓, or 33⅓ per cent., to be a loss of purchasing power of ⅓, just as our "mono-metalists" of the present day, and "bi-metalists," perhaps, as well, suppose that the "standard" changes, when, under bi-metalism, gold or silver rises above, or falls below, the geometrical par of 15½ and 1. M. Say says, in chap. XXI., p. 187, of his "Political Economy," American edition of 1830, translated by Clement C. Biddle, "The immediate consequence of a deterioration of the coin is a proportionate reduction of all debts and obligations payable in money," etc., etc., "by which reduction the debtor gains what the creditor loses;" whereas the rigorously exact statement of the result, as far as any statement can be made, is, that the government gains geometrically, by an addition to the units of its series at home all, or perhaps nearly all, the geometrical value it takes from the old units and adds to the new units of the national series; but those who received the money in the cases referred to by M. Say may not have lost anything except as buyers of foreign goods from foreign merchants, and probably did not lose anything else appreciable, although they may have imagined otherwise, while foreign merchants lost in some cases exactly in proportion to loss of weight. What they really lost otherwise was what they never had, — the power and privilege of coinage, and hence they were unable to make the profit made by the government, which had the coinage in its own hands. As buyers, they lost nothing in home trade, except so far as, *possibly*, the lengthening out of the monetary series at home, and so ultimately abroad throughout the world, diminished the geometrical value in commodities of *all* the units, full weight as well as light weight. The light weights would not go abroad; but by lengthening that part of the series at home in which the light weights circulated they allowed more or less of the heavy weights to go abroad, thus expanding the world's series, and diminishing in proportion the geometrical value of every unit in it; but this change was so slow that everybody probably gained as a seller all he lost as a buyer. There was no commodity loss, any more than there was in 1850–60, when, owing to the enormous increase of gold as compared with silver product, gold, according to "mono-metalists," became the "alternate" standard under bi-metalism, and fell in the bullion of silver, because its mass in the bullion market, as compared with silver, largely increased. Who gained or lost as buyer or seller by this change from "alternate standard" called silver, to alternate standard called gold? Nobody. But was there not a gain, and was there not a loss? There was a gain, but no loss, and the gain arose from the operation of piling up silver coin gathered from all parts of the world, but very largely from France, in the bullion markets of the world, to break the commodity fall of gold in silver. The fall of a commodity is rise of its quantity, and the rise of a commodity is fall of its quantity. Hence, to break the fall of gold, or, in other words, to balance the rise of its quantity, it was necessary to put more silver into the silver scale of the bullion market; and this was accomplished in the manner stated. It was not done for diversion, nor was it done to make a commodity profit, as M. Chevalier, an eminent economist, supposed, when he wrote an essay urging the necessity of the immediate abandonment of gold as "standard," and the adoption of silver as "sole standard," but it was done to make a profit in money. If the fall of gold had not been broken quickly in this manner it would have been broken slowly, but with like results in either case. The unit of gold had the same geometrical value in commodities at large as had that of silver, in the proportion of 15½ : 1, everywhere, although its commodity unit in bullion had fallen in silver slightly, and would have fallen, perhaps enormously, had not the fall been broken, not for its own sake, but in order to *make a profit*, by taking silver coin out of circulation, piling it up in the silver scale as commodity, and taking gold out of the gold scale, coining it, and putting it back in the "channels" of circulation as fast as the silver was taken out of them. The result was a rapid change in some quarters (France particularly) of silver for gold, which led M. Chevalier to imagine that the "commodity gold" in the hands of the French people and the Bank of France was falling with dangerous rapidity, whereas there was no fall of gold, in exchange for commodities at large, at all, but an actual break of the fall of commodity gold in silver only, which was of no consequence to any buyer or seller, for the fall might be broken or remain unbroken indifferently, as far as the geometrical value of either unit in commodities at large was concerned. To pay a seller in gold instead of silver, in bi-metallic France, did no wrong to him as a seller; were he a buyer himself instead of a seller, having silver, he would naturally get a premium for it if he could, by exchanging it for gold; but gold had not fallen in purchasing power, and its fall in bullion was temporary. Rise and fall in bullion has no direct, but only an indirect, influence upon rise and fall in geometrical value. In 1856-57, in the United States, when the unit of purchasing power had lost 25 per cent. geometrical value in most commodities, upon the average, gold and silver in bullion remained the same, nor did they change when geometrical values rose 25 per cent. afterwards. The like is true everywhere, under any and all circumstances; the rise and fall in the bullion market depends upon the quantity of silver in the silver scale, and the quantity of gold in the gold scale. The geometrical rise and fall of the monetary unit in all commodities is: first, rise and fall in every unit in the series, caused by permanent addition to, or subtraction from, the units of every series, constituting together the grand series of the world, whether in the shape of metallic or paper units; second, local addition to, and subtraction from, the local series, in the units put to actual use, by loans from individuals, whether for purposes of production or consumption; third, the additional loans over and above the latter, caused by bank loans; fourth, violent removals of gold and silver, by the agency of war, from one country to another; fifth, rise and fall in general production; sixth, rise of production and rise of prices in some quarters, and relative fall of prices and of production at the same time in other quarters, not caused by loans from individuals or banks; seventh, falling off in the production of absolute necessaries, which carries up the latter, and carries down relative necessaries in price.

All these quantities are *variables:* if general production falls off the geometrical value of each of the units in its general or local monetary series, or in both, falls with it; if quantity rises in one quarter and falls in another, values fall and rise inversely, although fall in value may be converted for a time into a money rise through loans, by compensating geometrical loss of a standard unit of commodity weight or measure with arithmetical gain, exactly proportioned to the rise in quantity of overproduction (rise of prices); and not only so, but also by checking or suspending the rise of relatively underproduced articles which have fallen in quantity, and so risen in value, thus causing the overproduced articles to rise in price most. If a loan is made in bank, the proceeds of which are laid out in production, and the product rises in quantity, and therefore its standard unit of quantity tends to fall in value, in exchange for quantity (which fall marks, through rise of price, the fall of the standard unit of quantity), the geometrical fall of the monetary unit borrowed is no loss but a temporary gain to the borrower, because it pays his debt in bank or elsewhere quite as well as if it had not fallen. It is no loss to the bank, because the bank does not own the money lent, but only makes a profit by the use of it. The loss is thus thrown upon all money-holders, depositors inclusive. But the product is still rising in quantity, and therefore the producer sells to another producer, who is perhaps a merchant and buys by the aid of a bank loan, thus stepping into the shoes of the first producer, who receives the money, pays his bank debt, and has a money profit left. By this process, mercantile debt due banks, and bank debt due depositors, increase to the extent of profits and charges, until a reaction sets in, and all the relatively over-produced goods fall as much in price below average as they have been carried in quantity above average; and nearly all prices change more or less; the absolute necessaries of life, but slightly, if at all. The truth of this assertion is shown by the course of production and prices, within the last ten years, in England and the United States. In spite of the elongation of the monetary series in the United States of late, by the non-retirement of any part of the enormous "volume" of paper money, and the "import" of gold, it has been impossible to carry up prices. A rise of iron and many other products began in 1879, but stopped suddenly, to the great loss of some producers and sellers, because buyers not only refused to consent to a further rise, but insisted on a fall. The only geometrical loss (rise of prices) to be noticed now is in stock values in the stock exchange, which is being carried, through the aid of heavy traffic and bank loans, to a dangerous point.

If money in any form were a commodity these phenomena would not exist: they exist, because money is neither a commodity nor a standard, but a part of a very complex process, and is, therefore, incapable of rising or falling as a commodity. It is a process or contrivance for the conversion of direct into indirect exchange. In all probability, 1½ per cent. in clearing centres, placed in common stock, and used as common stock, would be enough to supply all the calls for actual deliveries of gold made upon each and every bank. If loans were then made without any reference to reserve, they would be limited only by the necessary and unavoidable resulting reaction, through the falling off in those branches of production, to which the loans were applied. Production in those quarters would fall off, in consequence of the impossibility of making exchanges of commodities adequate to the maintenance of the overproduction: in other and monetary instead of commodity terms, the geometrical limitation to production in those quarters, to which the proceeds of bank loans were applied, by means of arithmetically limited money in the shape of gold coin, would be minimised and virtually lost, and the only remaining limitation would be the reaction which would naturally and unavoidably set in; and all the sooner, because of the loss of limitation now afforded, in point of fact, however imperfectly, by the reserve. Banking reserve is kept in one place, both in London and New York, but each bank draws upon its own several portion only, and not all the portions, jointly, as one whole. When its own portion is exhausted, its banking stops unless it can borrow, and inasmuch as it is *liable* to be called upon individually, for much more than 1½ per cent., it keeps more than 5 times that amount. And what is the *result* of its keeping so much? The result is that loans are *limited* by the costly metallic units of the reserve more or less efficiently in every bank, and if they were not, reactions in the shape of banking and commercial crises would set in more speedily than they do now. Limitation of loans is means to an end; the *real*, though not apparent, end behind the apparent means is the geometrical limitation of quantities produced through bank loans, by quantities not produced by the aid of bank loans, no matter what may be said, thought, or believed to the contrary.

Bank checks, clearings, and credits and debits on bank books, are all that *appears between* buyers and sellers who do their business through banks, save perhaps ½ of 1 per cent. metallic, and 2 per cent. paper, money. Two merchants, A. and B., have dealings; A. sells goods to the value of £1000 to B. and charges him in account, and B. sells A. goods to the value of £1500 and charges him in account. The accounts are set off, one against the other, and the balance paid by A.'s check, which B. hands to a banker and takes up a bill or note he owes him, of £500. Here we have a set-off of £1000 mercantile debt on one side, against £1000 mercantile debt on the other side, and a set-off of £500 of bank debt due A., and by him assigned, through the check, to B., against £500 mercantile debt, which B. owes the banker. Crediting A. £1000 on B.'s books, crediting B. £1000 on A.'s books, delivering to the banker, and canceling A.'s check of £500, canceling and surrendering to B. his bill or note of £500, and making all other proper entries resulting from all these movements on A.'s books, B.'s books, and the bankers' books, closes all the transactions, the abstract results of which are correctly called what they are, to wit, set-offs. But this is no barter, save in the sense that goods, to the value of £1000 on each side, have been *directly*, and not indirectly, exchanged. It is not primitive barter, or barter in the original meaning of the word, because the values, that is to say, the quantities and qualities, of the goods delivered have been valued, in other words, measured; or, in still other words, their geometrical relations of quantity in exchange, pursuant to mental estimates of quality, have been stated in the units of the monetary series of the market. If every monetary series could always maintain the same relation to commodities, diminishing the number of its units as a whole, as commodities contracted as a whole; and if quantities of commodities always maintained the same proportions to each other, changing only to the extent of human caprice and fancy in some articles, prices would be steady. If one article, like wheat, falls in quantity $\frac{1}{10}$, the tendency is to raise the unit measure of wheat 10 per cent. in price, because the $\frac{90}{100}$ in quantity tends towards being worth as much as $\frac{100}{100}$ would have been worth, were that quantity in the market. A unit measure of wheat which, as a whole, has fallen 10 per cent. in quantity, calls, therefore, for an increase in every unit measure of other commodities, directly or indirectly exchanged for it, sufficient to compensate geometrically for the loss in quantity on the part of wheat. This call is geometrically answered through money, by the purchases of consumers. If a money holder has $100, and wheat has fallen in quantity relatively to quantities of other commodities 10 per cent., the money holder pays for a unit measure of wheat, or its equivalent in flour or bread, enough to compensate geometrically, through money, for the fall in total quantity of wheat, and consequent rise in total quantities of other commodities indirectly exchanged for it, through money. This rise and fall is geometrically stated by monetary or arithmetical proportion, in all cases, whether there is an actual payment made in money or not. If the money holder has $100 in gold, and buys a bushel, a cental, or a quarter, of wheat, or its equivalent in flour or bread, when wheat has fallen in quantity, below average, 10 per cent., and its unit measure has therefore risen in value 10 per cent., he pays to the unit measure of wheat, be it bushel, cental, or quarter, out of his $100, one dollar for every ten over and above average, and has so much the less money left to buy the articles which, in consequence of the fall in quantity of wheat 10 per cent., have themselves risen in quantity, relatively to wheat. If there were but one other commodity in the world to exchange with, wheat would rise to 10 per cent. in value because it had fallen to that extent in quantity, the other commodity being supposed stationary; and wheat being supposed stationary, the other commodity would fall in value 10 per cent. by a rise in quantity 10 per cent.; or, in other words, wheat would rise, and the other commodity fall below the par of exchange, 5 per cent. Stating the rise and fall in rigorously exact terms of quantity, wheat has fallen in quantity 10 per cent. below average, quantity of the other commodity being called stationary, and the other commodity has risen equally in quantity relatively to wheat, if wheat be called stationary; or still again, wheat has risen, and the other commodity fallen, from average quantity, 5 per cent.* The remainder of the money will therefore buy, without the aid of the additional 10 per cent. which has been paid to wheat, as much as that remainder, with the 10 per cent. added, would have bought, if wheat had not fallen in quantity. The $100 in gold, *minus* the dollars paid to other commodities, which is laid out in wheat, does not rise in quantity as a commodity because wheat has fallen in quantity as a commodity, nor does it fall in quantity in respect to the other commodities because they have risen in quantity, but by paying *more units* by 10 per cent. than average to wheat, and therefore (in this case, which is a type of all others) so much the less on the average to all the other commodities, the proportion expresses geometrically the fact ("measures" values) that, in point of quantity, the wheat on hand to exchange for commodities at large is short in quantity 10 per cent., and its standard unit measure in the hands of the seller calls for proportionately more quantity from them. The change is geometrically shown by the following proportion: Average price of the unit of wheat + 10 per cent.: money remaining on hand after wheat is bought. Calling the gold a bartered commodity as well as the wheat, the gold has risen and fallen at one and the same time in other commodities, and at the same time in itself, which is absurd, but calling it an arithmetical series of 100 units called dollars limited arithmetically to that number by weight, by which all the commodities to be bought are, by supposition, geometrically divided into one hundred parts, the proportions show exactly the relations, by quantity, of all the commodities exchanged.

When money first came into use it expressed the relations of quantity in the limited number of commodities exchanged geometrically, and could by no possibility state them in any other manner. Let us suppose money out of the way, and the want of it to give rise to the establishment of corporate storehouses, containing, in quantity, all kinds of goods, to the amount of what we now call in money one million dollars each, for the purpose of getting rid of direct barter, and substituting for it corporate, or indirect, barter. The goods are deposited, and each depositor receives stamped metallic tickets, the whole issue for each storehouse amounting in number to one million. The mode of estimating values would be this: calling the total quantity of a commodity deposited worth so many units, how many units is another commodity worth? and in this manner the metallic tickets would be distributed. Each ticket would call for $\frac{1}{1,000,000}$ of the total of commodities in each corporate storehouse, and the *buying* would be a delivery of one or more metallic tickets to the storekeeper, preceded by the pricing, selection, and delivery of goods; and the stock could be maintained by *paying* the surrendered tickets to corporators, upon their depositing other commodities, up to the *limit* of surrendered tickets. Each ticket would be geometrically credited with $\frac{1}{1,000,000}$ of the total of commodities deposited, but the holders, instead of buying with each ticket $\frac{1}{1,000,000}$ of each commodity, would buy for every ticket its estimated equivalent in one or more commodities, and the purchases of all ticket holders, and the deposits of commodities in exchange for tickets, while they would not exhaust and replenish the grand total of commodities, in quantities harmoniously related with exactness, that is to say, in the same proportions of quantity and quality, save as varied by "demand" all the time, would nevertheless come near enough to such proportions for all practical purposes; for if any commodities were offered for deposit, in quantities largely in excess of the quantities of other commodities, other commodities would fall relatively in quantity, and the deposit of quantities in excess would be checked. The tickets, without regard to the value of their material, would have value only in exchange, or, in other words, in their surrender to the storekeeper, and taking commodities in exchange; or in depositing commodities, and taking in exchange a right to buy commodities. The tickets are therefore tokens, which demonstrate a right in the holder to buy commodities, because they have been taken in exchange for commodities. The right is abstract, because it is not a tangible thing, although it is proved (is a token) by the possession of a tangible thing. Call in one half the tickets, and the geometrical value of the remainder will be doubled; issue two for every one, and the value of each will be one half of what it was before; loan one fourth of them, and it will make no difference, for geometrical value is limited exactly, because arithmetically. The possession of the ticket gives the right, and therefore finders and holders by force or fraud exercise the right equally with true owners of the right.

Suppose, now, that instead of tokens made without regard to any geometrical proportion to the total existing metallic masses out of which they are made, the old tokens are surrendered and new tickets issued, the token of whose geometrical value is *weight*, instead of a *stamp* or mark. If the quantity of metallic material available for the use of each storehouse is exactly 100 pounds of one metal and exactly 1000 pounds of another metal, which have always been bartered for each other in the proportion of 1:10, and we assume the mining of each of those metals to stop from thenceforth, how can weight be made a token of geometrical value through arithmetical limitation, in place of the old stamp? Weight can be made a token only by using the *whole* mass of each metal, or *definite* portions of each, and keeping the remainder locked up, and in the latter case there would be great danger of fraudulent issues. The only perfect token, therefore, is a unit of fixed weight, geometrically proportioned to its own mass; that is to say, the total mass of its metal; and also geometrically proportioned by weight to each unit of the other mass, and thus to that mass itself; and no matter what might be thought, said, or believed, to the contrary, these proportions would be actually adopted for the purpose of finding and fixing a definite limit to the arithmetical monetary series, of which the units would be members, as means to an end; and the end would be — precisely what it is now — the steadying of geometrical value in the unit of purchasing power. If the units were thus limited in number arithmetically, by geometrical proportions of weight, the unit belonging to the larger mass would weigh ten times as much as the unit belonging to the smaller mass, and each mass would have half a million of units each. Double the number of tickets by reducing weight one half, and double commodities in all the storehouses, and each ticket has the same geometrical value as when it had double the weight, because the geometrical proportion or ratio of the ticket to commodities by means of arithmetical limitation, is the same. Commodities have doubled and tickets have doubled, but values are the same, because proportions are the same. Quadruple commodities and quadruple tickets, and the same proportion would be maintained, because the metal of the tickets has no "intrinsic" value in itself (geometrical proportion can be maintained by weight only) any more than the paper of a paper ticket in the same place. Value of the ticket in general lies in the right to take commodities in general out of deposit upon the surrender of the ticket to the storekeeper acting on behalf of the corporate body of depositors. Its particular value is the geometrical limit of that right, as determined by the total quantity of commodities deposited; maintenance of average proportion between quantities of commodities in deliveries of goods; changes in the wants, wishes, and caprices of surrenderers of tickets; length of the arithmetical series of which the ticket is a member in its geometrical relation to the total of commodities; which length is not a variable in this case, because it is arithmetically fixed by an absolutely limited mass, and exact and equal weight in each unit of the mass, and *possibly* some other comparatively *slight* considerations, which vary from time to time. Quantity of commodities throughout the world as a whole, is a variable. Quantities of commodities relatively to each other are variables. The length of the grand monetary arithmetical series of the world, as a *whole*, is a variable, and would be, even under general bi-metalism (although the effect would be reduced one half, by making the series continuous), a variable. Paper money, both convertible and inconvertible, is in a high degree a variable, because its issue is very variable, although it has extended the series, and thus, so far, minimizes the effect of expansion and contraction throughout the world in the quantities of commodities, and of addition to, and subtraction from, the units of the grand monetary series. Arithmetical additions to the series locally by means of bank loans, which *subtract* gold "commodities" in the shape of sovereigns and dollars from the monetary series in bank reserve, and add the "commodities" subtracted to the monetary series in use in "retail" trade, and loans which, while not subtracting from the reserve, give a bank credit, which adds units, but not "commodities," to the series in wholesale trade, are variables in the highest degree, notwithstanding the weight of each gold commodity, and the combined weight of all the "gold commodities" in the bank reserve, daily added to, and subtracted from, it. The metallic tickets (in the supposed case of the warehouses) whose delivery to, and surrender by, depositors, and the deposit of commodities in, and the deliveries of commodities from, the several warehouses, constituted, together, all the buying and selling there was, although they were made out of very valuable commodities having high intrinsic value, were not, in their character of tickets, commodities themselves, like the commodities our bankers keep in banking reserve, for if they were, the object in view — to convert direct into indirect exchange; direct barter into indirect barter — would be entirely defeated, and the goods would be withdrawn and the storehouses abandoned. There was no commodity value in the tickets, because their geometrical values, which had been substituted, in place of intrinsic value which had been eliminated, was vastly in excess of that value. They had no commodity value as money, for their utility was invaluable (not valuable), in a commodity sense. If a large amount of labor had been laid out upon some of them, to convert them, out of the material of a commodity, into commodities, they might have been deposited in the warehouses and sold in that character, and their commodity value would then have been their geometrical value + the value of the labor laid out on them.

Now, irony aside, this is a fair analogy to illustrate the nature of geometrical value, in the right which the possession of money confers, as distinguished from the weight of the money itself, and the commodity value regarded merely as a commodity. The difference is that sellers, instead of storekeepers on joint account, have the goods, and deliver them out of their own stock to buyers, who either keep and consume them, by paying in their own tickets, which they have received by putting their own goods into stock, in like manner to other buyers who used their own tickets, no borrowed tickets being used; or, on the other hand, there is sometimes in actual cases, no indirect exchange of goods, but only a buying with borrowed tickets, succeeded by selling the same goods for borrowed tickets, without any indirect exchange of commodities taking place at all. There is also a fair analogy between the bi-metalism of the storehouses and general bimetalism with gold and silver. The difference is, that in the storehouses the mass of each metal was *an exact quantity*, coined in exact or geometrical proportion, by weight, to the other metal, and the arithmetical series of each storehouse was limited with precision at all points in its line; whereas, in ancient times, by the withdrawal of vast masses of treasure to Rome, and in recent times by the withdrawal of vast masses of treasure by the hand of war to Germany, the *local* series was greatly elongated at the Roman and German points by addition; and after the discovery of America vast sums were added in some countries to the local series, diminishing there to an enormous extent the geometrical value of the metallic unit of gold and silver alike, because the series extended, arithmetically, in those countries faster than the total of commodities to be bought increased in those countries, geometrically; and, on account of slow communication and slight international trade, as compared with the present time, the additions extended slowly to other countries, until finally, by a general distribution throughout the world of the geometrical loss sustained by the unit of purchasing power prices, which had fallen locally, rose generally. Could the metallic unit of each kind have been, by means of international arrangements, weighted with new metal in *equal proportion*, prices would not have fallen so low, nor risen so high, afterwards, because there was no *real fall in the metal*, any more than in the light-weight coins of the French kings. Had America not been discovered, the old metal in the world's coins, could, inversely, have been made available to some extent, to keep geometrical values from rising, by gradually reducing weights of all coins in *equal proportions*, thus checking the metallic "famine" of the time, and its discouraging effect on production. The *practical* objection to the prevailing theory of money is, that it is not founded on real facts, but on apparent facts. The illusion is so strong, that in spite of all the contradictions between the apparent facts and the actual facts which analysis shows to be behind the apparent facts, and the resulting contradictions between the theories, which are framed to group with some show of science the apparent facts, and avoid the damaging effect of the actual facts (which instead of being employed to build up a science, as upon a safe and solid foundation, must actually be explained away, if possible), writers upon money are still fighting the Battle of the Standards; some of the bi-metalists affirming that there is such a thing as a bi-metallic "standard," which mono-metalists, in a body, deny; affirming, in reply, that the "standard" alternates, under bi-metalism, from silver to gold, and from gold to silver. The truth of this reply is admitted by some bi-metalists, but they rejoin that this alternation has a compensating, and therefore beneficial, influence in the distribution of the "commodities" gold and silver. Some mono-metalists affirm and some deny that gold has risen in exchange for commodities, and the like is true of some bi-metalists. Some mono-metalists and some bi-metalists say, that while gold has risen in exchange for commodities, everywhere, 16 per cent., silver has not fallen in exchange for commodities in mono-gold nor has it risen in mono-silver countries, — like India and China, for instance, — for if it had, the commodity silver ought to go rapidly to mono-silver countries, where it would "sell" for 16 per cent. more goods than it will in mono-gold countries. If money is a bartered commodity, this theory is apparently true; gold has risen and silver fallen as a commodity in London 16 per cent., and yet silver stays in London, and the excess does not go immediately to India and China, to "sell" for goods. Therefore it is argued that although it has fallen 16 per cent. in all countries as a commodity, it must at the same time have been stationary as a commodity in exchange for commodities bought and sold in mono-silver countries, and hence it does not go rapidly to India and China to "sell" for goods.

This demonstration is supplemented, practically, by the fact that the exports of silver to India have fallen off within the last five years. No answer can be given to such an argument; it is as unanswerable as any upon the commodity theory of money as an article of barter. But there is a monstrous fallacy somewhere: it cannot lie in the *deductions* from that part of the premiss which affirms money to be a bartered commodity, in the character of gold money and silver money; for if a commodity which costs less than $\frac{1}{4}$ of 1 per cent. to carry from one part of the world to another has fallen 16 per cent. everywhere, while at the same time it has not fallen in India for goods, it would certainly be very soon bought up and exported to India, and a handsome profit made by the purchase. In point of fact, then, while silver has fallen everywhere, it has been at the same time stationary everywhere, and the exports also show that no surplus has been sent to India. Therefore, as a commodity bartered for other commodities in India, it has not risen there (although it has fallen everywhere 16 per cent.), because no surplus has been sent to India; nor has it fallen in London, as such a commodity, for otherwise it would have been sent to India. But silver *has actually fallen* 16 per cent. in London, and the fall is the same thing as a rise of gold 16 per cent., or a rise of gold 8 per cent., and a fall of silver 8 per cent., from the average par of exchange of 15½ and 1. Calling an ounce of gold 15½, an ounce of silver is 1, at the old par of exchange of 15½ and 1. If silver has fallen 16 per cent. in gold, the present equation of exchange, waiving fractions, is 15½ oz. + 2 oz. $\frac{84}{100}$ of an ounce of silver = 1 oz. gold; or, what is the same thing, 16 oz. + $\frac{84}{100}$ of an ounce of silver = 1 oz. gold — $\frac{8}{100}$ of an ounce of gold; or, what is still the same, $\frac{84}{100}$ of an ounce of gold is now worth as much as 15½ ounces of silver. Gold has therefore risen, in accordance with the principle already demonstrated, 16 per cent. in value, *by falling in quantity relatively* to silver in bullion, but *not* relatively to other commodities as money, for according to this law of geometrical proportions in commodities exchanged for each other, which makes every exchange a practical affair, and not a mere metaphysical and mathematical abstraction, 84 gold sovereigns, 84 gold dollars, 84 gold napoleons, and 84 20-mark gold pieces of Germany, will now buy everywhere as much as 100 bought before, and 116 silver rupees, 116 sycee weights of Chinese silver and 116 Mexican silver dollars, will buy only as much as 100 bought before, anywhere and everywhere in the world, if it be *really* true that the fall of gold or silver in bullion has direct relation to prices. If the universal belief that gold and silver have as money by weight the same kind of value in exchange as the commodities which are correctly said to be bought and sold with gold and silver is really true, and not a mental or metaphysical illusion, then, I say, with emphasis, that it is mathematically certain that goods are 32 per cent. lower in mono-gold than in mono-silver countries; like India and China, for instance; and if prices of commodities have anything to do with present rates of exchange, exchange ought to be 32 per cent. against Calcutta. Can there be possibly any doubt that the geometrical law of quantities in commodities exchanged is as I have stated it? Is there, or can there be, any doubt that the arithmetical expression of value, as metaphysically conceived, is, on the whole, that is to say, upon the average, exactly inverse to geometrical values; in other words, quantities? If gold has actually risen 16 per cent. in commodities *as gold*, it means inversely that it has fallen in the quantity of it formerly given for commodities, before it rose in value, 16 per cent.; or, in other words, that it has fallen geometrically in quantity 16 per cent. relatively to goods it buys, and therefore the quantities of commodities given for gold have risen geometrically in gold 16 per cent.; and hence they have fallen in gold 16 per cent. But this is exactly the case with silver, which is geometrically in excess of gold in bullion 16 per cent., and has therefore fallen in gold, as its geometrical value, 16 per cent. Silver and commodities generally are thus both geometrically in excess of gold, and ought to exchange therefore at that excess, which excess is geometrically above par by 16 per cent. as compared with gold. It takes, then, under this hypothesis that *gold* has risen and *silver* fallen as money, only 84 sovereigns to buy as much how as 100 sovereigns bought before gold rose, and it takes 116 rupees to buy as much as 100 rupees bought before silver and other commodities rose together geometrically, and silver fell geometrically, 16 per cent. Prices are therefore 16 per cent. below the old par of 100 in England, and 16 per cent. above the old par of 100 in India. This makes a range of 32 per cent. between prices in India and England,

and prices are lower by 32 per cent. in England than in India. If this is *really* the case, silver can be sold for gold in Calcutta and the gold used to buy British goods to import and sell in Calcutta at a profit of 16 per cent., and exchange ought to be 16 per cent. in favor of Calcutta and at the same time 32 per cent. in favor of London, if prices in gold and silver have anything to do with the exchanges. But suppose gold has risen in value in London, by falling geometrically in quantity 16 per cent. in exchange for goods, and that silver has been geometrically stationary in Calcutta, thus giving a fall of prices in London of 16 per cent., and no change of prices in Calcutta: 84 sovereigns will then buy as much as 100 sovereigns bought before, and 100 rupees will buy the same as before. The 16 per cent. geometrical fall of gold in quantity given for commodities in London, is accompanied by (in a science founded on fact is *caused*, instead of accompanied by) an arithmetical fall of the units of gold in point of number (sovereigns), because a *general* rise of prices means more units, and a general fall of prices less units, in all buying and selling. If gold has fallen geometrically 16 per cent., it means, therefore, that there has been, also, at the same time, an arithmetical fall of gold in London, and this means a fall, or, more correctly, expresses a fall of 16 per cent. in gold prices below the old par of 100 in London, while they remain at the old par of 100 in Calcutta. If prices have anything to do with the "exchanges," as in justice and equity it *seems* that they ought at this time, then exchange should be at par, and at the same time 16 per cent. in favor of London, as we actually know it to be if we allow 16 per cent. for rise of gold in bullion, and at the same time 16 per cent. for rise of gold in goods ; but silver is geometrically in excess of gold everywhere, in the world in bullion, and not current as money in England, and hence will buy through gold in London 16 per cent. less than in Calcutta, if we regard actual facts only. Counting it, on the other hand, not a fall of general prices in London, but a rise of 16 above par in prices in Calcutta, and adding it to rise of gold in bullion of 16, and fall of silver in bullion of 16, making in all 48, exchange ought, under the hypothesis that money is a commodity, to run against Calcutta 48 per cent. instead of 16, thus making a difference of 32 per cent. between fact and what, under the hypothesis, ought to be fact. But suppose gold to be geometrically stationary in bullion, and prices at the old par of 100 in London, while they have risen above the old par of 100 in Calcutta 16 per cent., through a geometrical rise of commodity 16 per cent. on the part of silver. Prices are at par in London, and 16 per cent. above par in Calcutta: 1 pound of gold in London buys under this hypothesis as much as 18⅛ pounds of silver in Calcutta, which is exactly the rate in bullion. Exchange ought, therefore, to be at par, if prices *in gold and silver* have anything to do with the exchange, because if silver rises geometrically 16 per cent. not only in bullion but also in the quantity required to buy a given amount of goods, it rises at the same time arithmetically 16 per cent. in the number of pieces of silver which must be given, while the quantity of commodities given for it remains geometrically the same, loss of silver in bullion exchange being thus balanced by its geometrical gain of quantity in exchange for goods. Quantities of commodities, quantities of gold and silver, and arithmetical number of pieces of silver or gold, bank notes and " credits," are, in point of fact, in a state of fluxion continually, and geometrical proportion can only be predicated of them when they are by supposition stationary, after certain changes have occurred.

The illusion of actual rise of gold in value for commodities through a rise of value in bullion inverse to its geometrical fall in bullion, and the illusion of actual fall of silver for commodities, through a fall of its value in bullion, inverse to its geometrical rise in quantity, will *not solve* the problem of the exchanges between mono-gold and mono-silver countries. These illusions give rise to a series of what may be called mathematically opposite facts, or, in other words, contradictions, as above shown. From the *exchange angle* of observation, the illusion is that the commodity fall of gold and silver in bullion is a *commodity fall* of the silver of the silver dollar, rupee, and sycee unit, in exchange for commodities, either somewhere or everywhere, in an indefinite sense; or a commodity rise of the gold of the gold sovereign, gold dollar, gold napoleon, or gold 20-mark piece, somewhere or everywhere, in an indefinite sense; or else a rise of the gold and a fall of the silver *at one and the same time.* I have thought that illusions of this kind might possibly be superseded by science, during the life of this generation, but it looks now less probable. My advice to any reader who desires to make an attempt to dispel the illusion as it appears from this angle of observation, is to ask himself *here*, whether there is really a fall of silver, or rise of gold in bullion, *like a rise or fall of copper.* If copper falls in value through rise in quantity, it falls equally and everywhere, saving freight, insurance, mercantile charges for handling, tariffs, etc., without regard to the quantity which is out of market and in consumers' hands, in actual use, *except so far* as demand may fall off, because consumers have been supplied. But is there any such thing as demand for metallic money in a *commodity sense* like the demand for copper? Surely not, for if there were it would have its limits, and there would be no monetary spoliation through rise and fall of prices. If there really be such a thing as a *commodity demand* for money it *never knows when to stop*, like the demand for copper. What, then, is the true reason why the rise and fall of gold and silver in bullion are not accompanied by their rise and fall in commodities in general, like the rise and fall of copper? The answer is that copper, in the hands of consumers, is being consumed, and the metal of metallic money, in the hands of the consumers, who are buyers, sellers, and holders, is *being consumed also*, by the very fact that it is thus used. But the consumers' use of the copper is not a sale of the copper, nor is the use of money by buyers and sellers, in buying and selling, a sale, purchase, or barter of the money, but a mathematical use only. But what is the particular nature of this use; and why and wherein does it differ from purchase, barter, and sale? It differs in *effect* of rise and fall of demand, *if we assume* that there is such a thing as demand for metallic money in a commodity sense, because the more copper is demanded the higher it rises, and the less it is demanded the lower it falls, while the more metallic or any other money is demanded, inversely, the lower it falls, and the less it is demanded the higher it rises: the more copper out of market in consumers' hands the higher goes copper; the more metallic money out of market and in consumers' hands, as money, the lower goes the metal of the metallic unit of money: 1 pound of silver at 15½ is said to be worth say 100 pounds of copper, and 1 pound of gold is said to be worth say 1500 pounds of copper. Calling all the gold money in the world 5,000,000,000 of dollars, and silver money the same, the weight of the gold money would be about, say, 10,000 tons, and of the silver money, say 150,000 tons avoirdupois, with perhaps only $\frac{1}{100}$ of those quantities in bullion markets at any one time. While everybody supposes that the value of gold and silver, as money, rises and falls as these metals rise and fall in value in bullion, in some or other indefinite way, it seems to me that the illusion which gives rise to such a supposition may, at least, in part, be a confounding of the gold and silver market with other markets, and the so-called fall in bullion, which is really a geometrical rise and no more, with the idea of a commodity fall, like that of other commodities, while in point of fact the market of commodity gold is limited to the market of commodity silver, and the market of silver to that of gold ; and instead of the so-called fall of either metal in bullion, being proof that that metal has fallen in exchange for commodities, the proof is, that *because* that metal has geometrically risen in bullion, in *point of quantity*, the excess of metal in the bullion market is either metal from the mines not yet distributed to all parts, and to every pocket and money reserve of the world, which distribution is under bi-metalism rapid, and under mono-metalism slow ; or else it is metal which has been taken out of pockets and reserves, and piled up in the bullion market. If it has fallen in bullion, which actually means that it has risen geometrically in quantity relative to the other metal, in bullion, it means inversely that there is less of that other metal in the bullion market and therefore so much more of it distributed as money, relative to the other. The fact that silver has "fallen" in bullion 16 per cent. means, therefore, that *more gold than silver* has gone out of the bullion markets and been distributed as money, while no gold has gone out of circulation *into* the bullion market, but much silver has gone out of circulation into the bullion markets, together with more than an average portion of the silver product of the silver mines. Instead of a rise of gold in commodities, as it is called, which actually means a rise in the mathematical, because proportional, value of the unit of money in mono-gold countries, the tendency has been of late the other way, and all the gold which could be obtained was needed to take the place of departing silver in circulation; and large amounts of silver under limited coinage of silver have been called for to take the place of departing gold: in some *now* mono-gold countries, like France, enormous sums, amounting to hundreds of millions, have thus been displaced and distributed, and the work is still going on. There has not been much silver to spare as yet for mono-silver countries, like India and China, but the time is approaching when the tide will slowly turn in the bullion markets, and, inversely to the present rise of gold and fall of silver, so called, in bullion, *gold will fall, and silver rise, in bullion*, as the gold unit rises, and the silver unit falls, in purchasing power. Up to this time it has been impossible for silver to leave for mono-silver countries in amounts sufficient to raise prices, and there has not been enough of it distributed to mono-gold countries, to supplement gold by limited coinage, to make prices fall materially in mono-gold countries. It will require a distribution, or, more properly, redistribution of at least 2,000,000,000 (dollars) in gold and silver, to *shorten the whole metallic series 8 per cent., relative to its whole dividend in commodities, in mono-gold, and lengthen it 8 per cent., in mono-silver countries*

Every man who *looks at facts and reflects* may possibly be able to discover that inasmuch as he means by "volume" of silver the whole amount of silver distributed as money, and by "volume" of gold the amount of gold so distributed, and because he understands that adding 8 per cent. to the volume of silver means, henceforth, a distribution of 8 per cent. more than there is now of silver, to mono-silver countries, and comparatively little silver to mono-gold countries, *this means 8 per cent. more than their former share of metal for mono-silver, and 8 per cent. less than their former share for mono-gold countries, causing a total metallic displacement of 16 per cent. and a redistribution, relative to the dividend totals of commodities, of 16 per cent.;* and this will amount to $1,600,000,000, adding which sum to $800,000,000 more, as the probable amount which will go into commodity use for silver and gold plate, and other gold and silver commodities, gives a total of $2,400,000,000 of production.

To complete the displacement and make the redistribution will probably take 15 and perhaps 20 years longer, if mono-metalism continues, and the science which I have attempted to introduce, *founded on facts*, does not through its general adoption prevent it before it is accomplished; which is by no means probable. The silver unit will fall in purchasing power, *because* purchasing power or proportional value of the monetary unit in commodities, *is the thing that changes, and not the total pur-*

chasing power of all the units taken as a whole, because there is but *one* dividend, and that is the total of commodities; and the monetary unit, whether of silver or gold, is one of the units in the divisor. To add 8 per cent. to the divisor in mono-silver, and subtract 8 per cent. from it in mono-gold countries, makes a difference in all of 16 per cent.; and it will take a long time to make the addition and subtraction, because it will be very slow and gradual, doing little harm *as it progresses;* all danger of monetary spoliation, except on long undertakings, being prevented, through the very slow distribution of loss and gain. The gradual rise of silver and fall of gold in bullion will show inversely, that units are being gradually added to the divisor in mono-silver, and subtracted from the divisor in mono-gold countries. We must not fail to take into account the fact that by diminishing the area of the silver unit we are diminishing the volume (dividend) of commodities belonging to silver, while we are increasing that remaining for gold, and thus the impossibility of carrying up prices so high in silver, in any less time, is demonstrated; and if it is impossible to carry up prices so high in silver in any less time, it is equally impossible to carry them down more rapidly in gold, because if it be impossible to "expand," or, in correct language, to lengthen out, the silver series, relatively to its commodities, 8 per cent. in less than 15 years, it is equally impossible to shorten the gold series 8 per cent., relatively to its commodities, in less than 15 years: one feat is as much out of the question as the other. The problem of the exchanges, then, between mono-gold and mono-silver countries, ***remains*** unsolved. What theory will solve it? No theory will solve it save one, and that is the theory I have advanced, applying it to explain the phenomena. Prices of many commodities and services, and some kinds of labor, have fallen within ten years past everywhere, but it is not in consequence of any rise of gold in purchasing power, by subtraction from the monetary series ("contraction," or, in other words, fall in quantity of gold, in the "channels of circulation"), of mono-gold countries; on the contrary, the "volume" of money is enormously larger in the United States now than it was ten years, five years, or even three years ago. Average prices of absolute necessaries have kept up for ten years past, but most commodities have fallen and cannot be carried up, to stay. Sellers carried up some prices in 1879, in the United States, but buyers refused to go beyond a certain point, and a reaction set in. Prices of most goods have, within ten years, fallen, not only without reference to the fact that there was no diminution of "volume" in money, but in spite of the fact that there has been a great "expansion of volume," which is still going on. The explanation of this fact is that the falling off in production has enormously "contracted" the use of money, in wages and profits paid by the aid of bank and other loans, which falling off in the use of money by loans, together with over-stock thrown on the market, was more potent in carrying down some prices than mere volume had been in carrying them up, while the absolute necessaries of life remained all the time, comparatively speaking, stationary in price. Bank loans are, for the most part, applied towards what is called productive consumption, but the real forces at work, and the results, are masked by money. A. borrows 100,000 dollars from a bank, and makes pig iron into rails for a railroad. He pays out 20 per cent. in wages, and the buyer of the rails borrows 150,000 dollars from a bank, to buy the rails, adding profits, insurance, freight, etc. The manufacturers, laborers, and projectors spend for absolute and other necessaries of life a large portion of the money. The result is, in many cases, that this consumption is very unproductive to them, while it is highly productive, sooner or later, to land-owners, and the able managers of the stock exchange, and of bank loans to buyers in the stock exchange.

In order to maintain values, that is to say, *average proportions between quantities produced, prospective value in the quantities in excess is not sufficient;* in other words, a prospect that, sooner or later, quantities in defect will increase enough to balance quantities in excess is not sufficient; but *actual value*, in the shape of quantity on the other side of the exchange, ready and waiting to be exchanged, *is demanded.* Nine tenths of the exchanges are exchanges of commodities, and a prolonged increase or gain in quantity, in one half of them, more or less, cannot be maintained without a reaction, which unsettles values of all kinds. This is the real cause of commercial, banking, and industrial crises: to affirm that they are caused by an "excess of credits" has no real meaning whatever, unless we remove the mask of money and perceive that the operative credit is a borrowing of commodities to furnish support, and at the same time raw material, to those who are producing other commodities, and because the latter fall in value as they increase in quantity, it is impossible to carry their production to the point of a severe and prolonged reaction (crisis), unless, and only so far as, the fall (loss) can be thrown upon buyers, and thus the community at large, and so distributed; the distributors making, sometimes, large profits. If iron or cloth has increased in excess of other commodities 12½ per cent., while its price, instead of falling 12½ per cent., has actually risen 12½ per cent., a manufacturer sells his iron for 12½ per cent. more money than he could have got for it when he made the bank loan, by means of which he produced it. This leaves him 12½ per cent. gain in rise of price over and above profits, which 12½ per cent. balances the actual, though masked loss of 12½ per cent. value in exchange for other commodities on the part of the iron. The bank, having no capital in the money loaned, but having given it an extra circulation through the confidence or "credit" of its depositors, makes its profits in discount and interest, and the loss is thus distrib uted among the buyers who buy only with money not borrowed, until a reaction sets in, and the remaining loss, *masked*, hitherto in the hands of buyers with borrowed money, who have not yet sold, and thus distributed their loss, is not only thrown upon such buyers, but the loss to them *is doubled* by means of a fall of price ; amounting, not merely to 12½ per cent., but to 25 per cent. That part of the loss hitherto distributed to buyers at large for cash not borrowed of 12½ per cent. is then largely recouped by a fall of 12½ per cent. below average, suffered by the unfortunate buyers, who still hold stock, while the prolonged period requisite to restore equilibrium carries up, in time, the low prices of the capital (stocks, bonds, etc.) into which the overproduced commodities had been largely carried; thus throwing enormous loss upon the producers, and enormous gains into the hands of the able and unscrupulous managers of the stock exchange. Such a kind of production and distribution, in its last stage, is now in progress in the United States, and more or less in England. There is no fall of prices in the United States, caused by rise in the value of "gold," nor is there in England, or elsewhere in the world, while at the same time there is no rise of prices anywhere, caused by the fall of silver. The quantities of the commodities silver and gold in the world have not increased in excess of the grand total of commodities in the world, since Germany abandoned silver mono-metalism and introduced gold mono-metalism, and France and other nations suspended free coinage of silver.

The question is, not merely whether gold has fallen short or silver increased ***in bullion exchange***, but whether either has increased or diminished materially in reference to the totals of commodities to which they have not commodity but arithmetical ***relation***, by means of additions to, or subtraction from, the monetary series of which they are members. Silver has largely departed from Germany and gold has taken its place, so far establishing a gold series in place of a silver one. There are probably as many units in the combined gold and subsidiary silver (imperfect token) series, which has taken the place of the silver (perfect token series), in Germany, and as many in the combined gold and subsidiary silver series of France and other nations, which have taken the place of the units in the former bi-metallic (perfect token) series, as there were before the change. The problem to be solved is the work to be done, and that will consist of the very slow and gradual redistribution of the units of silver (perfect token) money in mono-silver countries, and of gold in mono-gold countries, until finally the geometrical ratio of 15½ and 1 becomes again, ***upon the short average***, the commodity ratio. Gold and silver have ***no commodity value*** in exchange for commodities at large: they have commodity value as jewelry, plate, etc., because a pound of gold jewelry or plate is worth more than a pound of gold, as a bank or government note used as money acquires more value as a security than it possesses as money, if it draws interest, which soon retires it from circulation.

The only other commodity value of gold and silver is in exchange for each other. Being each perfect token money, by means of weight, as a co-efficient in fixing the place of their units in any bi-metallic or mono-metallic series, which can be constructed out of their masses, all considerations, save that of weight, must be and are *unconsciously* eliminated from their masses. If there were *no concurrent action whatever* in respect to proportions of weight, and every nation established a proportion of its own, confusion would arise, through the necessity of resorting frequently to bullion exchange, and thus losing all benefit of fixed invariable geometrical proportion in consequence of its conversion into variable commodity proportion, and thus making a *useless* commodity loss or gain by the sacrifice of a *very useful* geometrical proportion. It is impossible to prevent gold and silver from having more or less fluctuation of commodity values; in other words, proportions to each other in bullion. No man in his senses can seriously deny that gold and silver are commodities, and "highly valuable" commodities, possessing "high intrinsic value," but in the exchanges in which they are employed as money they have no more "commodity value" than paper or any other units: they are units and tokens, *in* which the proportions, *by* which commodities exchange indirectly for each other, are stated by means of buyers and sellers in one commodity at a time; the units, which are the sum total of price of that commodity, being delivered to sellers, who in turn deliver the commodities to buyers. That commodities possessing high "intrinsic value," like gold and silver, are requisite to furnish the *whole*, or an arithmetically steady proportional number of, the units of the personal or individual series which each money holder and buyer carries; of the national series which is the sum of these; and, still more, of the grand series of the world, which is the sum total of all of them, may be readily conceded by any theory of money founded on *actual* facts, because no other money has hitherto succeeded in maintaining a standard degree of geometrical steadiness, by reducing variations, in the number of the units put to actual use in any monetary series, *to a minimum*. That masses, having the advantage of possessing *just enough quantity* and no more, without "intrinsic value," if such masses there were, *might*, if geometrically proportioned by measure or weight, answer the purposes of money, may be conceded *as an abstract proposition* undoubtedly; but, taking *actual facts* as a test, we may say that "intrinsic value" is indispensable, and we thus found the science of money, *so far*, *on facts*.

Paper money, having no limitation arithmetically, has never been arithmetically maintained at a *minimum variation in the length of its series*, like gold and silver, and probably it never can be. The Chinese experiment failed; the "bills of credit" of the American Revolutionary war failed; the French assignats and mandates failed; the "greenbacks" of the late civil war in the United States approached the limits of failure and success, while the late enormous issues of the Bank of France during the Franco-German war did not fail, because they were limited by able financiers, and over and above all other considerations they *did not exceed*, but probably fell short of, the metallic units which they retired, and there was perfect confidence in them. Prices of commodities did not rise, because the number of units in the metallic series which retired was not exceeded by the paper units which took their place. Had the metallic units been paper units they would not have retired, but would have kept in circulation, in company with the units of the new issue, and arithmetical extension would have enormously diminished the geometrical value of the unit of purchasing power. A confused idea of the greater safety of the metallic unit, and of some kind of commodity value in it, like that of any other commodity, has a tendency to retire the metallic unit if a paper "or credit" unit can be used in its place, while, at the same time, bankers and merchants and other producers leave the metallic units in a reserve, to save the trouble and labor of handling and moving them about. Gold and silver, when circulating in company in a joint series with units arithmetically limited by the geometrical proportion of 15½ and 1, or any other geometrical proportion, maintain the joint series continuously as far as the joint series (or, in other words, bi-metalism) prevails. Where bi-metalism stops the continuity of the series is broken, and *commodity value or proportion of the metals as bullion in exchange, the one for the other, takes the place of the geometrical proportion, by forcing the metals into a commodity exchange.* One unit may carry its metal *into* that exchange with geometrical loss in commodities at large, as compared with that of the other unit, and come *out* with a commodity gain which is indirectly reconverted into geometrical gain in commodities at large, by putting the metal for which it exchanges into circulation in its place, where it is not current itself, and, on the other hand, it may carry its metal *into* the exchange with geometrical commodity gain, which, by geometrical bullion exchange, is reconverted indirectly, in like manner, into geometrical loss in commodities at large.

The *true object of bi-metalism,* no matter what may be said, thought, or believed on the subject, is to annihilate commodity proportions, and establish and maintain instead geometrical proportions, and thus prevent the joint metallic series of the world from being broken in two. If the units carried no valuable commodity with them there would be no difficulty, because they would have no valuable metal which they are forced now to send to bullion exchange because they are not current themselves. If there were none but paper units, which have no valuable commodity to carry with them, they would not move to any great extent from one country to another, and if they did so, arithmetical credit would always pay geometrical debt, and geometrical credit arithmetical debt; the former by premium, the latter by discount. Instead of an "alternate standard," which the illusion (that commodity value is geometrical value, and therefore the gold which falls in commodity value in bullion becomes the alternate standard to-day, and silver which falls in commodity value in bullion to-morrow the standard to-morrow) creates in the mind, the object of bi-metalism is to abolish commodity standard, whether single or double, permanent or alternate, or any other name by which it may be called. We have now arrived at a point where we can solve the problem of "the exchanges" and at the same time demonstrate that the monetary unit has no commodity value but that of a unit, counted, and stated or called dollar, pound, franc, rupee, etc.; the unit, not having geometrical value *by reason of its quantity of metal*, but by *reason of the fact*, that the greater the weight of the metal in the unit, so much shorter in exact proportion is the monetary series of which it is a member, and so much the greater *in exact proportion* the geometrical value of the unit in commodities at large. General prices have not fallen in England in consequence of any rise of geometrical value in the unit of gold, except as already stated, nor have general prices risen in India, and yet there is an *apparent* geometrical debt to commodities which is due by the unit of purchasing power (rupee) in India when through bills of exchange converted into the unit of purchasing power (pound) in England. Although always convertible at the geometrical rate of 15½ pounds of silver for 1 pound of gold *through goods*, it owes a debt of, say, 16 per cent. to that unit if convertible through bills of exchange, and the debt is paid, more or less exactly. Why does it owe that debt and why is that debt paid? It owes the debt because in spite of the fact that it has lost no geometrical value in India in goods, and the unit of gold has gained no geometrical value in England, the silver metal which it carries has to be sent to the commodity or bullion exchange, and *bartered* for the commodity gold, which has risen in that exchange 16 per cent., unless, what is the same thing for the exchange, silver has fallen 16 per cent.; or, what is still the same, gold has risen and silver fallen each 8 per cent.: it is *one* of these *accidents*, and it is immaterial which, for the unit. The commodity or bullion rates are the same everywhere, and it can be, and actually is, bartered in Calcutta precisely as it would be in London. The barter can be made by taking either rupees or bar silver, — it matters not which, — to the market; putting silver in the silver scale and gold in the gold scale *of value*, then taking out the gold and sending it to England where it has geometrical value in the proportion of 15½ and 1, and *paying* it as money. Geometrically in goods, that is to say as money, it avails in the proportion of 15½ and 1, in harmony with which sovereigns and rupees (gold and silver) have been, and still are, coined and paid throughout the world, excepting only the United States, and stand *arithmetically in that place in the series in which those proportions place them*, while, as commodities, they vary 16 per cent. in total range from that proportion against silver; and hence the silver rupees paid out are compelled, waiving fractions, to add 16 to every 100 (18 to 1 instead of 15½ to 1), in order to pay the difference whenever gold goes to England to buy or pay debts instead of sending goods in its place, through a *forced* and *unavoidable* substitution of itself for goods.

If silver were universally abandoned as perfect token money, it would be *sold* like copper, and not *bartered* for gold: its partial abandonment has carried large masses into bullion exchange, and taken large masses of gold out: gold has not risen in London or elsewhere, nor has silver fallen in Calcutta or elsewhere, *in arithmetical exchange for commodities*, but it has fallen as a commodity, in barter for the only commodity (gold) it is ever bartered for, 16 per cent.; while that commodity (gold), exchanged as money arithmetically for goods, has not risen arithmetically at all. Silver has therefore fallen as a commodity *only*, and *in that character* it has fallen equally all over the world. Gold will buy no more in London than silver in Calcutta, but silver, because forced into bullion exchange, will buy less than gold in London by 16 per cent., and gold, if carried to Calcutta, will, for the same reason, buy more by 16 per cent. than silver. Hence there is a profit in sending gold to Calcutta from London to buy goods, but there is a greater profit in exchanging gold, through bills, for rupees (commodity gold for commodity silver), laying out the rupees for goods and shipping the goods to London. But there is a vast difference in the cost of getting the gold in favor of London and against Calcutta, and it amounts to 16 per cent. in goods. Many classes of goods are much lower — it may be 16 and possibly 25 per cent. — in London than they were ten years ago, or perhaps even five years ago, in consequence of the general reaction, by way of fall, in what is called the demand for goods; and the falling off arises from the falling off in the supply of money which maintains at average the *length of the monetary series of those who receive wages and profits:* and the money prices of the goods, which, having increased (risen) geometrically in volume, in the market of consumers *who buy with cash not borrowed*, have fallen arithmetically in price by being thrown on the market, and sold for what they will bring. This fall of price has no *direct* relation to the geometrical exchange by weight between silver and gold as money. I have demonstrated by actual banking, commercial and monetary, facts (in banking and commerce) that gold as money, and by consequence silver, is not wanted as a commodity, and is *not demanded* as a commodity: I have also demonstrated, by monetary and commercial facts, that money is not a commodity; and I now intend, in the second place, to demonstrate mathematically, with metaphysical aid, that it is not a commodity, but a human contrivance or process for the conversion of direct (geometrical) exchange; or, in other words, direct barter into indirect exchange, otherwise called by me indirect barter, through the units of an arithmetical monetary series. A process or contrivance, being an abstract term, can by no possibility be a commodity or article of merchandise.

CHAPTER II.

THE MATHEMATICS OF MONEY.

I AM compelled to use words out of their ordinary application or meaning, because nearly all the words in use relating to money, commerce, and banking, are associated with the idea, and necessarily imply, that money, at least when it is in the shape of gold or silver, is a commodity or article of merchandise, as well as iron, copper, or platinum. Some people have denied that metallic money has a commodity value, and some writers on money not only deny the proposition but attempt to show, and actually do show, *some* reasons why the proposition is not true, but *all this amounts to nothing in point of science*, because illusion is so strong and overpowering in sustaining the proposition. Gold money is given in exchange *directly* for commodities; gold is *as much a metallic commodity as copper;* two tons of copper are worth twice as much as one ton, and two pounds of gold are worth twice as much as one pound. *Why*, then, is not gold coin, the exact weight of which is a matter of *great importance*, *bartered for copper*, wnen it is exchanged for copper? The illusion of a commodity value in the gold in this exchange, and that it is a *standard com-*

modity, to measure the values of other commodities by, *through*, or *by means of*, its "*intrinsic value*" is so strong, that "*good* reasons" are not sufficient to dispel the illusion: nothing but *absolute* (*mathematical*), *followed by metaphysical, demonstration can ever succeed;* and when, if ever, it succeeds, long time will be needed to educate the minds of scientists in the new theory, and, through them a still longer time to establish it for practical purposes. The illusion is still very strong that the sun moves daily around the earth, and it is expressed daily in words, while it is still the practical theory for purposes of sidereal or clock time, and navigation. A passenger in an American railroad coach at a station sees another train moving out of the station and believes it to be his own train that is moving, until he *demonstrates to himself that it is not*, by actually looking out and perceiving the wheels of the coaches on the other train *in motion.* The abstract idea of power and force outside of man is represented by man in an idol (gold, silver, or wood) which he makes with his own hands. The idol is a symbol of the abstract idea, but instead of being *logically consistent* and treating it as a symbol *only*, he adores it and asks favors at one moment, and cuffs and kicks it the next. Even the Jews, who had seen idolatry carried to such a disgusting extreme in Egypt, that the reaction from the extreme had carried the minds of the educated class in Egypt (the priests) back to the original idea, more or less, were unable for a long time to be educated *up to the original idea*, in spite of all injunctions to the contrary, and, in the Babylonish captivity, were again being educated *away from the original idea*, which may have given rise to the masterly irony of the prophet Isaiah, in relation to idols.

All commodities but gold and silver *are wanted for personal use*, and while it is *impossible* to have too much of all together, it is just as impossible to have too much of *any one*, as a mere general or abstract proposition ; and in the absence of all analysis to ascertain actual facts and thus make the science of Political Economy *practically* useful, this abstract proposition must be, and actually is, taken to be an established proposition of the science, being argued *abstractly* by M. J. B. Say, with great ability and force. The important " practical " fact which analysis lays open to our intellectual eyes, is that the abstract proposition would be true if all producers could live by it. It would be true if every producer could go on without limitation, and always live well on what other producers actually had on hand to give him for all his produce. *Because they are unable to have such a surplus*, and he is unable to go on producing *and live*, *unless they are able to have it*, we have commercial and banking crises. But gold and silver as money are not wanted by actual consumers, but only as the medium of bringing to consumers what they want. All this (about gold and silver) has been repeatedly said in substance by able writers, and with great force and truth by Mr. Price. Why do such able writers fail to perceive that there is a fallacy lurking somewhere, if it be also true, as commonly asserted and believed, and affirmed in the clearest and plainest terms by themselves, that gold and silver (money) are commodities, bartered in the character of money for other commodities; and so giving rise to double barter, which has taken the place of single barter; the gold and silver rising and falling, as commodities, in their character of money, as do other commodities? The *principal reason* is, that their theory (the prevailing one) is a logical necessity, unless they adopt the theory that money is not merely a commodity, but part of a complicated mathematical process, by means of which all commodities are, not directly, but indirectly, bartered or exchanged for each other, through the medium of the units of numberless (monetary) arithmetical, which are at the same time geometrical, series, standing separately each by itself, and while so standing, constituting, nevertheless, together, one grand commercial world's whole, which may be subdivided into national and community, and lastly resolved into each indirect exchange, which is a sale and purchase + a resulting purchase and sale, the number of which exchanges is, so to speak, almost infinite. Before resolving money mathematically into such a process it is indispensable that they mentally retire "intrinsic value," so-called, from gold and silver; *leaving no attribute but the* geometrical one of weight in the weight units of (mono) gold, (mono) silver, or (bi-metallic) money standing in due geometrical order in the arithmetical series, or, in other words, the whole or any subordinate part of the joint arithmetical + geometrical series. This it is difficult to do, although the *value* of the gold or silver unit in the series has no existence in the human intellect, which alone *makes* value, save as the token or evidence of a right in commodities (capital) at large, which means the right to buy commodities in minute proportions of quantity as ranged for exchange more or less perfectly in the mental view of all buyers and sellers. Suppose these minute portions of each commodity to be ranged in order before the eyes of a buyer instead of the commodity he actually buys; *these are not what* he wants, and if he wanted them, it would in most cases be impracticable to give them. He takes the (assumed) equivalent, therefore, in one or more commodities, and the nearer the assumption approaches the truth the steadier are prices, the nearer to justice and equity the distribution of wealth. The value of the unit in any monetary series depends upon the total quantity of commodities, the proportions they bear to each other, and the *number* of parts into which, by supposition, they are (approximately) divided. That the average buying power of the unit of metallic money is not value depending *directly* upon the weight of the unit, is hard to perceive until after prolonged reflection, and, like the movements of the Copernican theory, it cannot be perceived, mentally, by the eyes of the mind without demonstra tion. It must, nevertheless, be either clearly perceived without demonstration, which is impossible, by demonstration which is possible, or else it must be assumed, and the assumption rigorously maintained in order to solve the problem of money and "the exchanges." Take a series of 100 American double eagles, call them Dollars, and by supposition eliminate the alloy, the remainder being called Gold of the highest practicable degree of purity; place them in a row, and then range in a parallel row 100 sovereigns, assuming that the total mass of fine gold in the first series is 100 ounces, and in the second 25 ounces. The dollar is worth 4 times as much as the sovereign, not (as the paramount cause) because it has 4 times the weight, but *because* (as the paramount cause) the two arithmetical series relate arithmetically to geometrical portions (more or less perfectly) of all commodities taken as a whole, throughout the world; and hence the weight of the unit in each series is a co-efficient, either to add to it enough units to give it its true value in any national monetary series of the world, whose metallic unit having less weight than itself is in a series longer than its own, reduce it arithmetically, if need be, to the position of fraction of an arithmetical unit in any series shorter than its own, or take it as a *geometrical standard of weight*, by which to reconstruct any arithmetical series of the world, and give it the length it would have if its units were all dollars or sovereigns. The dollar or sovereign, like every other metallic unit, is thus, actually or constructively, at all times convertible into any series of the world, while at the same time, on the other hand, it can convert any other series into a series arithmetically limited like its own. When it goes into another metallic series it takes its chances after it gets there of what it can buy in that series, but a *paper unit cannot get into another paper series at all*, and is only arithmetically debited or credited in exchange. It is very hard to get rid of the illusion that a coin quadrupled in weight is quadrupled in buying power, *absolutely by weight*, and, in fact, it cannot be got rid of *without absolute demonstration.* The real fact is that the *potential* value is quadrupled, *not absolutely because* weight is quadrupled (the illusion lies in supposing effect to be cause), but *because* the commodities to which the series is, or rather will be, related by the purchases it makes in the character of money, are thus divided geometrically, *by supposition, into 25 parts instead of 100 parts.* In other words, the value of the unit of money is, potentially, *the right to buy commodities generally in a certain average proportion*, the chief factor in the determination and limitation of which right is the length of the *arithmetical* series, or, in other words, the number of units through which buying power is exercised; and quantity of metal (weight of *fine* gold) determines with rigorous precision the length of the series, and *through* that length the arithmetical value of the unit, weight becoming thus the *co-efficient* of value instead of *value itself.*

Take, now, the case of a mono-metallic series, which gives place to a bi-metallic series, whose continuity is subsequently broken by inability to make arithmetical conversion. Suppose 4 storehouses, one of wheat, one of rye, one of oats, and one of barley, divided geometrically into 100 parts, by the issue to owners of 100 tickets or tokens, in the shape of metallic cylinders of "very valuable" metal, of 1 ounce each; the metal being the token of value, and weight its co-efficient; all danger of confounding this metal with any other being, by supposition, excluded. There are 100 joint and undivided rights, for which there are 100 metallic tokens to be redeemed for each holder by supposition, either in equal portions from each storehouse, any two or three of the storehouses, or only one of the storehouses, at holder's option. The *potential* value of each ounce cylinder (a geometrically constructed unit of weight) is not in the ounce itself, but in the $\frac{1}{100}$ part of all the grain, by the nearest average practicable, which $\frac{1}{100}$ part is, *practically*, resolved into the grain actually given in exchange for the ticket, out of one or more of the storehouses. Recall the units, double their weight, and re-issue them, giving one ticket to one man, to hold and pay for account of himself and another, and they now constitute an arithmetical series of 50 instead of 100. Total weight in the first series stands geometrically to total weight in the second series, as 1 : 1, but weight in the unit of the first series stands to weight in the unit of the second series as 1:2, and the purchasing power of the unit in the first series to the purchasing power of the unit in the second series as 1:2.

Quantities of grain (commodities) belonging to each unit in the first series, stand to quantities belonging to each unit in the second series, not in the *exact* geometrical proportion of 1:2, but that proportion, as varied by "intrinsic value" and demand, while units in the first series stand to units in the second series, inversely in point of total numbers, as 2:1. Exact geometrical proportions of weight carried by the units, and proportions of quantities of commodities inexact by reason of "intrinsic value" and demand, are inverse to the proportion formed between the units of the first series and the units of the second series; the first two proportions move in one direction and the last (arithmetical proportion) in another direction. The value of the unit in the last series is not doubled because weight is doubled, but its value is doubled *because* the doubling of weight has placed its unit in an arithmetical scale or series where its geometrical value in grain (in other words its token proportion) is doubled in quantity. Geometrical values (commodities), geometrically limited quantities of metal in the tokens, and arithmetical values, constitute a series which, including resulting ratios or fractions (decimal or regular, or it may be both), and ranged in the order stated, give direct proportions between metallic quantities without intrinsic value (weights of money), and quantities (commodities) proportioned less perfectly by reason of their "intrinsic value," and lastly give arithmetical proportion, inverse to each of the preceding proportions, because while quantities of commodities continue the same, the units in the second series are, in point of number, only one half those of the first series. This makes the value of the unit in the first series in commodities directly proportioned to the number of units in the second series, and inverse to that of its own series. The difference arises from the new arithmetical limitation resulting from a new geometrical apportionment of weight; *for the same quantity of metal* constitutes each mono-metallic series. The metal is not bought and sold as a commodity, but it is, by means of geometrical division into units of equal weight, converted into a *perfect set of tokens*, arithmetically (in point of number) limited, *through* weight as a co-efficient of the arithmetical unit, in maintaining steadily the length of its series. The unit of weight in the series stands geometrically proportioned to every other unit of weight in the series, because the weights are all exactly the same. Each unit of weight is also geometrically proportioned to the weight of all the remaining units of the series, and if any number of units be subtracted from that number (99) it is geometrically related to each of the totals, — the minuend, the subtrahend, and the remainder, — and finally it is geometrically related to the whole mass, standing in the proportion of 1 ounce : 100 ounces. Construct the unit in the form of a flat, plain, or milled cylinder, and it will then be a *geometrically constructed*, as well as geometrically proportioned, unit of weight, having geometrical proportions of quantity *in extension*, *in addition to weight.* Place all the cylinders in geometrical order by superposition, and they furnish a long solid cylinder, of which the unit cylinders are geometrically proportioned parts. Geometrical construction in *form*, *or extension*, is not *essential*, but it is highly convenient; while geometrical proportion by means of *exact* weight is indispensable to limit any series at the definite point agreed upon; which, in this case, is 100; but by making weight, $\frac{1}{10}$ ounce, instead of 1 ounce, might, when the series *was first constructed*, have been 1000. Weight is thus a co-efficient, not only in making the series of any length desired, when the series is first constructed, but in the *fixation* of the series steadily at that point, wherever it may be, as we now see daily in the case of the *inconveniently heavy silver dollar*, *five-franc piece*, *rupee*, etc. Suppose now 4 other storehouses, not in the same, but a neighboring, place, to be stored, one with salted beef, another with salted pork, another with bacon, and the other with lard; and the whole contents of these 4 provision storehouses worth the whole contents of the 4 grain storehouses, for which metallic tickets of another metal are issued to 100 other owners, each of which tickets contains $\frac{1}{10}$ of an ounce of another metal ten times as valuable as the other, *because by supposition it is not only a highly useful* metal like the other, but *because* there is but $\frac{1}{10}$ as much of it actually produced, and in existence; all danger of confounding this particular metal with any other being, by supposition, excluded, as in the case of the heavy metal. The 100 new tickets consist of ten pounds of metal, geometrically divided with rigorous accuracy into units of the weight of $\frac{1}{10}$ of an ounce each, and they are also geometrically related to each other by construction, as in the case of the heavy 1 ounce units.

Suppose that these light units and the heavy units are both paid out by owners of the produce in all the 8 storehouses to sellers of other produce in the same and other places, and thus obtain a limited circulation, their value (total quantity) being geometrically limited as a whole by the total contents of the 8 storehouses, while the value of each share is limited, registered, and fixed, by a joint bimetallic series of 200 units, maintained in their total number of 200, arithmetically, by the co-efficiency of two metals, geometrically limited in quantity by 110 pounds joint weight, the 10 pounds of one series being, by the force of human wants and human wills, made the geometrical equivalent of the 100 pounds in the other series, for the purpose of indirectly exchanging commodity rights in the abstract, and thereby indirectly bartering the goods in store for each other, and for other goods as well. The tickets by supposition change hands indiscriminately, until finally the heavy weights are repudiated as full tokens by the holders of light weights, and an overpowering illusion follows that value lies in the metal, instead of the right of buying with it. The heavy metal still continues, nevertheless, exchangeable directly for goods in the first 4 warehouses (of grain), but it can be used in the last 4 only by exchanging it for the other metal at a higher rate by 16 per cent., and then paying out the latter in its stead. The metal market now stands not 1 : 10, but $1 : 10 + \frac{16}{100}$ of 10, while the tickets still maintain their old geometrical proportion of 1 : 10, each series continuing arithmetically at 100, and the joint bi-metallic series at 200. Instead, however, of constituting 1 joint bi-metallic series for all practical buying purposes, its continuity is destroyed, and it is broken into two hostile parts, for all the monetary uses of exchange. The heavy metal has a series of 100 units, like the light metal, but a certain holder who has a sub-series of 10 heavy weights which is $\frac{1}{10}$ in number of the whole series of 100, of which it constitutes $\frac{1}{10}$ part, is compelled to subtract *arithmetically* 16 per cent. from the 10 units he owns, when he exchanges the metal of his 10 units for its present equivalent in the metal of the light units. It *is not a direct* subtraction made because the *purchasing power* of his unit in commodities, or, in other words, the value of the commodity right proved by his unit, has fallen in the place where it is current money, but because he is compelled to make the exchange where his money is uncurrent before he can buy at all, and while he is not thus compelled to exchange, and *can*, *therefore*, use his 10 units directly without any loss where they are current, nevertheless, the metal of his 10 units can be procured in either place with the metal of 10 of the other units — as many of the latter as will make $\frac{16}{100}$ of their total. By indirect (the only possible) conversion, therefore, his 10 units are worth only $8 + \frac{40}{100}$ light units $=$ 1 ounce — $\frac{16}{100}$ of an ounce, or, in other words, $\frac{84}{100}$ of an ounce; and thus, under the illusion of commodity value in the metals, 8 and $\frac{40}{100}$ light units only $=$ his 10 heavy units. If he exchanges heavy for light metal he does not *directly* shorten his series by subtraction, and, by shortening it, shorten every other sub-series of heavy weights, increasing thereby geometrical value for other buyers inversely in proportion, but he shortens it (indirectly) *for himself only through a forced substitution of a new geometrical proportion* between his own heavy-weight sub-series and the light-weight series into which he is forced to convert it, which, instead of being a steady geometrical proportion, is a proportion in a constant state of fluxion, because its two members are *variables* and *not geometrical standard weights.* Being variables, and not standards, their values can only be found approximately by averaging the variations through a calculus, abandoning exact geometrical proportions, and relying for compensation for losses in the total of purchasing power, *on variations in an opposite direction,* if possible, *in some other quarters.* If a purchase is made directly with light weights taken or procured in exchange for heavy weights, it is either $\frac{84}{100}$ of an ounce light weights = 10 heavy weights, or 1 ounce light weights = 10 + $\frac{160}{100}$ or, in other terms, 11 and $\frac{3}{5}$ heavy weights. It is — (negative), or debit of heavy metal, and + (positive), or credit of light metal. The debit of light metal in quantity is the credit of heavy metal in quantity, while the credit of light metal in value is the debit of heavy metal in value. The —, or negative, of light metal in exchange is the +, or positive, of heavy metal in exchange: the debit, or —, of checks, drafts, and bills of exchange is on the side of the heavy metal, and subtracts 16 per cent. from the number of units in the arithmetical series of heavy weights, *not, I repeat, directly*, but indirectly, by the establishment of a new and variable proportion instead of the fixed geometrical one, before prevailing. There is no *direct* fall of heavy metal, and no *direct* rise of light metal in goods, but there is *an indirect* loss in the number of rights belonging to the units of the heavy metal, every time they are exchanged for the units of the light metal. The light weights buy no more than they did before where they are alone current, and the heavy weights buy no less than before, where they are alone current as tokens, but if the holder of heavy weights has a debt or tax to pay to one who buys only with light weights, he must lose $\frac{16}{100}$ out of every heavy weight, when he exchanges his heavy weights for light weights ; and to speak with rigorous, in other words, mathematical, accuracy, his loss consists in being compelled, without any *actual* recoinage, to subtract arithmetically (an arithmetical problem or sum) $\frac{16}{100}$, not from the whole series of heavy units, but from every unit in *his individual* series of heavy units, which are the only units he can obtain for his goods in order to buy goods where light weights alone are current, making a loss of 16 per cent. This is precisely the same thing to him as if he could and should at no additional expense break up his series of heavy weights, and reconstruct the series anew by giving each unit of the newly reconstructed series $\frac{16}{100}$ more metal than before. Geometrical proportion continues the same, because each unit gains equally in metal, and the total of metal is the same, but the geometrical ($\frac{16}{100}$) addition of weight to each unit, shortens the series 16 per cent. arithmetically: the arithmetical $-$ is the complement of the geometrical $+$; the arithmetical $+$ the complement of the geometrical $-$; and *vice versa* in this complex series. The geometrical (metallic) quantity of the heavy unit, as the monetary arithmetical series is, *in point of fact*, geometrically constructed, is $\frac{100 \text{ oz.}}{100}$, while its arithmetical unit is simply 1. Therefore $\frac{100 \text{ oz.}}{100} = 1$ as money, in buying power, but $\frac{100 \text{ oz.} + 16 \text{ oz.}}{100} = 1 - \frac{16}{100}$ of 1 only in money exchange on one side, while $\frac{100 \text{ oz.} - 16 \text{ oz.}}{100} = 1 + \frac{16}{100}$ of 1 on the other side. Geometrical addition is the complement of arithmetical subtraction, and geometrical subtraction that of arithmetical addition, and *vice versa.* The only possible mode of avoiding loss to holders of heavy metal is, to maintain the series as a bi-metallic one with the same unvarying geometrical weight in each unit as before, or to increase geometrical weight in the unit of each series 16 per cent., or by some other fixed quantity, and its geometrical value in commodities at the same time 16 per cent., not directly *in consequence* of increasing weight, but indirectly *in consequence* of diminishing the arithmetical value of the units in each series 16 per cent. each, or, on the other hand, by diminishing geometrical weight in each unit of each series 16 per cent., to add $\frac{16}{100}$ of arithmetical value to the unit of each series, and *thereby* to diminish inversely and equally the geometrical value (purchasing power) in commodities, of each unit. In a short bi-metallic series of 200 units, the arithmetical exchange value of the units of which jointly is maintained steadily by one unvarying apportionment of weight to each unit in each series, loss or gain of a few units is a matter of greater or lesser importance, as the geometrical total of commodities divided by the sum of its units is greater or lesser. If the series were ten thousand millions instead of 200 only, millions could be added on the one hand, or subtracted on the other, without seriously affecting the purchasing power of the unit, if accomplished slowly but universally, so that the losses of buyers would be made up to them as sellers, and *vice versa ;* or even rapidly, if universally, provided there were no debts to pay. Apply now this mathematical demonstration to actual facts and actual cases. If the whole bi-metallic series of the world be called ten thousand silver dollars and gold dollars in all, half and half, weighed, and geometrically proportioned by weight and construction, in the proportion of 1 gold to 15½ silver, save only the silver of the United States, unwisely coined at 16 instead of 15½, we must add to that ten thousand millions, as a practical corollary from the demonstration, all the paper money not covered by an equal amount of metallic money + all bank "deposit credits" used as money — the metallic money in deposit.

The whole monetary series of the world is made up of parts. These parts constitute each a subseries by itself. If a man has $10,000, or £10,000, in bank, which he circulates by check, it is a subseries of $10,000, or £10,000, as the case may be, and adds so much to the total series of the world. The total of "bank credits" — the metallic money behind it is probably much greater than the total of bank notes and other paper money — the metallic money retired by it. Call the credit and paper totals one joint total of five thousand millions of dollars, and probably four fifths of it are in mono-gold countries, making in the mono-gold series approximately, say four thousand millions of paper and credit, and in the mono-silver one thousand millions only. Under my theory of money, founded mathematically upon facts, the money holders who hold the ten thousand millions of metallic money, and the five thousand millions of other money, have paid approximately fifteen thousand millions in geometrical intrinsic values for their money, either actually or representatively, and their money is worth, approximately, the same geometrical (intrinsic) values given for it by its present owners. The fifteen thousand millions value is probably only $\frac{15}{40}$ of the actual total of wealth, capital, and productive force, or whatever we choose to call it, in France, and not more than $\frac{1}{20}$ of the total capital of the world. At least $\frac{19}{20}$ of the world's wealth continues in the same hands, while $\frac{1}{20}$, in the shape of commodities chiefly, is *indirectly exchanged or bartered, through the medium of money.* Call the gross annual produce consumed thirty thousand millions, one half of which is consumed without being bought and sold, we have fifteen thousand millions left, which is bought and sold. Calling all the buying power in the hands of holders ready and waiting to be used, and which they have acquired as sellers, fifteen thousand millions of token values, the fifteen thousand millions in geometrical (intrinsic) values, and the fifteen thousand millions of token values, in the character of geometrically-proportioned metallic units, paper units, and bank-credit units, are equal each to the other in exchange value, and constitute potentially one grand equation of exchange. Some of the units do not change hands as often as once in a year, but others change hands much oftener, and the total thus changing hands constitutes an average equaling every year, as a whole, the grand total of money. John Law, a man of undoubted ability, if not genius, honestly believed and maintained that there was no limit to the amount of money which *might* be issued, save the limit of the grand total of productive capital; and such is the opinion of many other theorists, while it at the same time is the *logical inference* from the present theory of commodity value in money. Such an issue is a *mathematical impossibility.* But *why* is it a mathematical impossibility? Because the mathematical theory of money which I have demonstrated is true, and the impossibility of such an issue is a corollary. It is impossible, *because money has no value in itself*, being a process through which commodities are indirectly exchanged, by the masterly contrivance of stating their value relations in terms of the units of a limited series, the units of which (total series), as a whole, constitute the totals (several series) in the hands of all buyers; and the crowning master-piece of the process or contrivance is a series of metallic units limited arithmetically, with the highest degree of precision attainable by geometrically-proportioned and geometrically-constructed units of weight and surface. The series, as a whole, divides the total of values (intrinsic), to which it is related, into, say, fifteen thousand million parts, and since there is but one total of (intrinsic) values to which the series is related, it is a *mathematical* impossibility to add anything by issues of new tokens, *because* it is a mathematical impossibility to add units to the series, without diminishing in proportion and inversely the related geometrical (in trinsic) value of each unit in exact proportion. It is impossible, *for this reason*, to make the purchasing power of the grand total of money more than, say, $\frac{1}{20}$, more or less, of the grand total of productive capital. If three hundred thousand millions of gold and silver, or any other, money were in the hands of buyers, instead of fifteen thousand millions, the grand total of wealth in the world would increase *nominally* to sixty hundred thousand millions, or 20 times the present total, always keeping the proportion of total wealth or productive capital to total purchasing power approximately as 20 : 1, more or less accurately, under any and all circumstances. This mathematical fact is true, and always will be true, because money is not a commodity, but a process or corporate contrivance for the conversion of direct into indirect exchange or barter, whichever one chooses to call it. Productive capital of all kinds is stated in terms of money, and all kinds of capital, lands, stocks, etc., are bought and sold; but the great want supplied by money *is the indirect exchange of commodities*, nationally and internationally; and for this purpose gold and silver are indispensable. A miner, a government, or a bank, cannot, and therefore does not, create any value in the character of money, because money value is value in commodities bought and sold *only*. When money was invented, and came into use in its earliest form, a particular commodity, or, more properly, a particular quantity of a commodity, was probably called the equivalent in exchange of, say, three units, in the shape of shells, for instance. This gave a starting point. If one commodity was called 3 another would, as a result, be called 2, 1, or, possibly, 5, by way of relation. If called 5, the whole number of units in the series would be 8, which would be its arithmetical limitation. A great many other proportions for other commodities could be stated with the units, and if one man possessed 3 units and another 5, the former would have $\frac{3}{8}$ and the latter $\frac{5}{8}$ of total purchasing power. In the barter which preceded the money there was no purchasing power in the shape of money, but each commodity furnished one member of a proportion, in its value relation to the other commodity exchanged for it.

Call the quantity of one commodity to be exchanged 3, and the first member of a proportion is given, which limits the other member relating to the other quantity to, say, 2, 4, or 6, and in the latter case (6) we have two members of a proportion constituting a series of 9 units extemporized on the spot, but having no tangible qualities, save in the commodities themselves. Convert these abstract units into tangible units like shells, give them purchasing power as tokens, and we have a tangible limited series of units, 9 in number. To have a clear idea of money one must abandon, or, rather, escape permanently from, the illusion that the use of any kind of money ever did, or ever can, consist of bartering one commodity or article of merchandise directly for another; for, if it were so, mankind would have been compelled to invent some other mode of exchange than that afforded by money: the mind must arrive by *careful mental analysis and prolonged and masterly exertion of the will*, at the angle of observation, from which it can clearly perceive that the invention of money was the invention and application of a *mathematical process founded on the principles of mathematical proportion*, by means of which direct barter was converted into indirect barter, every seller delivering goods to a buyer, thenceforth indirectly bartering those goods to the buyer in exchange for goods which the buyer had, as a seller, previously bartered to another buyer through the medium of money. It is a great error to suppose that there is any such thing as direct barter of a primitive kind, in a state of civilization: it is confounding corporate use of a commodity with barter or sale of a commodity. Tobacco was used in Virginia in early colonial times, it is said, as a common medium of exchange, like gold and silver. This supposed fact is an illusory one. Tobacco was the grand article of export, and had a well-known price. Other articles were mostly consumed at home, while English and colonial goods came back in place of the tobacco; *and, in the absence of money*, tobacco, having a well-known price and ready sale abroad, furnished in all cases, *through its well-known price and ready sale abroad*, when bartered at home, the first member of a *monetary proportion*, which limited in monetary units the other member of the proportion furnished by the commodity exchanged for the tobacco. In primitive barter there *was no permanent monetary series in existence*, out of which to write down units in order to state prices and frame a proportion, as is now done, where goods are sold on time, or mutual sales take place between merchants, giving rise to debits and credits. In primitive barter, I repeat, a series extemporized on the spot, out of the commodities bartered, was alone employed, and probably grew out of the *number* of standard measures of quantity on each side, as determined by more or less exact units of measure or weight. If one commodity had 3 standard units of weight, for instance, and another had 9 standard units of measure in surface, after a mental estimate of the intrinsic qualities of each commodity, the 3 standard units of weight were exchanged for, say, 6 standard units of measure. Taking 3 as the first member of the extemporized proportion, the other member would also be 3, thus giving the proportion 3 : 3, and the actual equation of exchange in general terms, $3 = 3$. This would leave the 3 standard units of measure remaining on hand, and not exchanged, $1\frac{1}{2}$ in value, and all the property, including that remaining on hand, $7\frac{1}{2}$ units, which would be the arithmetical or money value of all the property. The 3 standard units of weight might have been called 6 instead of 3, and the extemporized proportion between the things exchanged would then have been 6 : 6, and the equation $6 = 6$, instead of $3 = 3$, while the whole monetary series, being the aggregate of the units in each member of the proportion + the units belonging to the 3 units of measure not bartered, would then furnish a monetary series of 15 instead of 7½. The original motive force which brought about the invention of money was the necessity, or want, of exchanging surplus commodities *indirectly*, instead of directly; and the invention consisted in the conversion of an abstract monetary series, in a constant state of fluxion, *into a tangible and invariable one*, so to speak, because, until the invention went into operation, a new series might be extemporized *on every occasion*, to say nothing of the inconvenience of direct exchange. The natural tendency, nevertheless, was towards a *fixation* of the units of proportion between the two kinds of commodities exchanged, and thence by relation the fixation would be gradually extended, more or less perfectly, to other commodities. As a result the tendency would be to bring all the inhabitants of a country from their isolated condition of direct barterers into a corporate society of indirect barterers by the powerful stimulus to trade furnished by the units of a fixed and permanent series, resulting from the conversion of abstract units into tangible units having a locality and name; an arithmetical relation only at first; a geometrical apportionment of weight afterwards; and from the very first a token value in commodities, inverse to the arithmetical length of the series.

Several grand principles follow at once as corol laries from this science of money in its earliest stages, some of which I have already proved and established by actual facts: first, it is impossible to issue money in excess of the grand fund of commodities in which the total of units of money in the hands of all holders is the evidence of so many dividend rights. The more money issued, so much the longer is the series and so much less is the dividend right, the less money issued the shorter the series and the greater the dividend right. *Commodities are the fund to be divided*, and services of all kinds, and *fixed productive capital*, are themselves paid for in commodities. Commodities are required to support labor: land, with its improvements of all kinds, is paid for by so many years purchase; that is to say, by the amount of commodities it yields annually, either directly or indirectly, multiplied by a certain number of years. Some commodities go annually in large amounts *into the shape of improvements on real estate*, and constitute, before they go there, so much of the grand dividend, but the *whole dividend* is the total of commodities which the total money in the hands of all holders will bring. The dividend cannot, as a whole, be made larger, either by increasing or diminishing the total number of shares, but each share can be very much increased or diminished to the great spoliation of buyers, by sudden changes, where buyers *cannot have time to gain as sellers* what they lose as buyers, and *vice versa*. Hence, money having value only by relation, it is impossible *by any issues of it, even gold and silver*, to increase money value in excess of, say, $\frac{1}{20}$ of all the property in the world. The second principle or corollary is that, inasmuch as the longer the series, the smaller the dividend shares, *an unbroken series extending throughout the world* will give the steadiest prices everywhere. Under general bi-metalism I will assume, as before, that the series is (in dollars), say, fifteen thousand millions, and in pounds, three thousand millions, while under mono-metalism, now universally prevailing (for the last remnant of the bi-metallic chain has been broken under the illusion that metallic money is a commodity, instead of a mathematical process, by which mathematical problems are being continually worked out), the series has been broken in two, with, say, five thousand millions gold and four thousand millions paper and bank credit in mono-gold countries, making in all nine thousand millions of dollars, while there are five thousand millions of silver and one thousand millions paper and credit in mono-silver countries, supposing, as I do, all subsidiary silver to be covered by the metallic money. *To cut a series of this length in two*, and require every sub-series of silver to pay toll when its owner has to pay a debt, tribute, or tax, to any one who cannot use his silver series because he buys where a sub-series of gold only will be taken, *is spoliation, innocently, because ignorantly*, committed. The illusion is *so overpowering*, that the grand fact that all the metallic money on the silver side *has been* *weighed out*, and *geometrically proportioned both by weight and construction*, in the proportion of 15½ silver to 1 gold, and all the gold on the gold side in the proportion of 1 gold to 15½ silver, and *therefore* there *cannot* be, as yet, any material change of prices, either on one side or the other, is not perceived *intellectually* at all. Before undertaking the feat of breaking the continuity of the bi-metallic chain and dividing it in two parts, it was essential to undertake the (*impossible*) feat of a general abandonment of the old geometrical proportion of 15½ and 1, and adopt and carry out, by a universal treaty, a new geometrical proportion of, say, $1 - \frac{8}{100}$ of gold and $15\frac{1}{2} + \frac{8}{100}$ of silver, as the best proportion that could be made by *guess* and carried into effect for the purpose of maintaining the exchanges as nearly as possible at the new par resulting from the breaking of the old bi-metallic chain, although the better way would have been to let it alone, while the best way of all *now* is to make no attempt whatever to restore its continuity until the new science of money here demonstrated is generally adopted; which cannot be expected for a considerable period.

The illusion of a *commodity* or mercantile value in metallic money is so strong that any hope of making the bi-metallic series continuous in every country of the world, is idle for the present: before that time comes, scientists must have a theory of money founded on actual, and not illusory, facts. Gold and silver now exchange for each other *in-*

directly at the old geometrical par of 15½ and 1, while they exchange *directly* at the commodity par of 18 and 1. If a merchant in Calcutta buys Indian goods with rupees at the old geometrical par of 15½ and 1, ships the goods to London and sells them for gold, at the same par of 15½ and 1, he has thus indirectly exchanged, say, 15½ pounds of silver in rupees, *through* goods, for 1 pound of gold in sovereigns. The 2 equations are, first, 15½ pounds of silver in rupees = Indian goods; the second equation is Indian goods = 1 pound of gold: eliminating the intermediate Indian goods, we have 15½ pounds silver rupees = 1 pound of gold sovereigns. The merchant in Calcutta, who buys Indian goods, ships them to London and sells them there at average prices for *British gold sovereigns*, has *through* goods "bought" his pound of gold for 15½ pounds of silver, but in selling his bill of exchange drawn against the gold, he debits every 15½ pounds of silver constituting a silver series of, say (at a guess), 550, 16 per cent., being 88 rupees more than his gold cost him. He paid out 550 rupees, and he gets 550 + 88 rupees in their place. On the other hand, the London merchant who "buys" 15½ pounds of silver rupees in Calcutta through the medium of a bill of exchange drawn upon Calcutta, debits the silver series 16 per cent. by an *arithmetical credit* given to his *series* of 1 pound of gold in sovereigns, accomplished by deducting 16 per cent. from his series of gold sovereigns, without making any change in that of the silver rupees. It is either adding 16 per cent. to every series of 15½ pounds of silver rupees, when 1 pound of gold is exchanged for it, or taking 16 per cent. from every series of 1 pound of gold in sovereigns, when 15½ pounds of silver rupees are exchanged for it. It is in reality a debit of the silver series *outside of mono-silver countries everywhere* 16 per cent. whenever a series of 1 pound of gold money is exchanged for it, over and above the geometrical par of 15½ and 1, at which gold and silver still stand in every monetary series of the world. It is a profitable business to ship Indian goods from Calcutta to London, and draw bills of exchange against the proceeds in gold money, and it is equally profitable in London to buy bills of exchange, or orders, drawn in London, not against the proceeds of British goods sold in Calcutta *for silver*, but against silver money collected in India, through the payment of taxes or tribute, either to pay interest on Indian debt, or the expenses of Indian government. British and other goods, aside from the absolute necessaries, like wheat and provisions, have fallen greatly in price within the last six years, while silver in bullion has fallen to, and remained at, say, 16 per cent. below the old average commodity proportion of 15½ and 1, which is also the geometrical proportion to-day, but this fall, I repeat, is a necessary reaction from the high prices of the period preceding it, and it is nearly the same all over the world, although, perhaps, ⅔ or ¾ of the excess was the result of the energy of production in England and the United States.

This fall has no relation to the rise of exchange in London, or fall of exchange in Calcutta.

Indirect barter is what all commercial nations, all commercial communities, and individuals are engaged in for the most part, while they are at the same time producing as fast as they are bartering; and if they produce in any one or more quarters faster than in all other quarters, there must be a reaction to maintain the average, save only that it is impossible to overproduce, *relatively to other production*, the absolute necessaries of life. Hence, I say, the relation or proportion between Indian staple raw materials and British goods may, perhaps, be at present in favor of the former. Moreover, if any one who examines this matter of Indian exchanges, deems actual facts of any importance, it is certain there has been no "enlargement of volume" of the money of India, as Mr. J. Barr Robertson has well shown in the Independent Section of the "Westminster Review," October No., 1880, nor can there have been any material change in the "volume" of gold in mono-gold countries, as he has also shown by statistics, independently of the demonstration I have made. France has taken into her circulation a large portion of the silver Germany has discarded, and Germany has taken gold in lieu of the discarded silver, but, on the whole, there has been but little change in the "volume" of money in mono-gold countries. Unquestionably, the change has begun, although but little more has been accomplished, as yet, than a Western redistribution of silver and gold, as the immediate result of the breaking of the last link in the bi-metallic chain in the territory of France and her monetary allies. The *grand and final change* which I shall hereafter demonstrate to be the unavoidable result of the causes in operation *is yet to come.* Meantime, silver, subject to the qualifications before made, in reference to falling off in production and prices of certain classes of goods, is worth as much as ever in London, to use *in indirect barter:* in other words, it is worth 15½ in indirect barter, but in direct barter, in the bullion market, it is worth 16 per cent. less. Thus, if a merchant in Calcutta buys goods with 15½ pounds of silver in rupees, he ships the goods to London and sells them for 1 pound of gold in sovereigns, and has thus exchanged 15½ pounds of silver for 1 pound of gold, which he pays for British goods, whereas, if, *instead of buying goods* in Calcutta, he had exchanged his silver for gold in Calcutta or London, he would have had only $\frac{84}{100}$ of a pound in gold to buy British goods. In like manner a merchant in London who buys 1 "gold pound's worth of goods," and ships to Calcutta and sells the goods there for rupees, gets only 15½ pounds of silver to buy Indian goods, whereas, if he had exchanged his gold for silver in London or Calcutta he would have had, say, 18 pounds of silver to show, instead of 15½ pounds only. What is the cause of the difference, and why, if all this is fact and not fancy, do merchants take 15½ pounds of silver when they can get 18 pounds for the same cost, and why does anybody pay 18 pounds of silver for 1 pound of gold when he can get it for 15½ pounds? No theory of money, founded *on apparent facts only*, will answer these questions satisfactorily: no theory save the one herein set forth, founded on actual facts, can possibly answer these questions in a sense which the human intellect can comprehend. Gold and silver are the money of the world: their purchasing power, either jointly or severally, is worth in exchange enormously more than their commodity value could by any possibility be, if they were not money. If there were no kind of metallic money but one there would be no bullion market, the mono-metal being money, and nothing but money, whether coined or uncoined. But there are, in point of fact, two metals instead of one, and, whether coined or uncoined, they are money as to all things in the world, *always saving and excepting each other.* They cannot buy and sell each other as commodities, because, I repeat, they are worth vastly more as money to buy commodities, than to sell as commodities themselves: they *cannot possibly* be bought and sold in the ordinary sense of buying and selling, as long as every pound, ounce, and pennyweight can be used as money somewhere in the world. But being commodities, *they must, in their character of commodities*, be exchanged *directly*, that is to say, directly bartered for each other (without reference to "intrinsic value"), pound for pound, ounce for ounce, and pennyweight for pennyweight, *according to the* *quantities of each in market.* Bullion brokers, money brokers, and bankers are certainly as sharp-eyed as any other men, in making a profit, where *it is possible* to make it, and hence, when the product of gold increased so enormously after the discoveries in California and Australia, it would, undoubtedly, have fallen greatly, perhaps five times as much as it did actually, had not sharp-eyed brokers and bankers carried silver, not from mono-silver countries (because gold would not have been allowed to take the place of the silver), but from bi-metallic countries like France, whence silver money could be exchanged for gold money, and carried *out of circulation into the bullion market*, to take there the character of commodity, and be exchanged in that character for gold as commodity, in order that gold might be taken away and used as money, in the place of the silver which had thus been carried out of circulation into the bullion market. *This broke the fall of gold*, a matter of minor importance undoubtedly, because it was only a question of breaking the fall quickly or slowly. Nothing of this kind can take place *now*. Gold cannot now be taken out of circulation as money and exchanged as bullion for silver, in order to put the silver in circulation in its place, as gold formerly took the place of silver, because there is no bi-metallic country which can take the silver and give the gold to take the place of silver in the bullion market. But because trade, for the most part, is indirect barter, the question, although *a very important one*, is *not* *of paramount*, while it is in the highest degree of minor, importance. It is not of paramount importance, *because* more than $\frac{9}{10}$ of trade is indirect barter, whereby, in spite of mono-metalism and a fall of silver as commodity in consequence, at least 16 per cent., below the geometrical par of 15½ and 1, the geometrical par, where silver money is paid on either side, *is still maintained in all cases of indirect barter*, which is, I repeat, more than $\frac{9}{10}$ of all trade; and as to the $\frac{1}{10}$, more or less, there is *surely a mutual compensation, more or less perfect, or more or less imperfect, according to circumstances.* It is impossible, for instance, to collect a bounty of 16 per cent., as in India, from all the tax-payers of a country, and hand it over as a bounty (the fact that it is a bounty is not seen, because the illusory theory of money yet prevailing masks the fact), without compensation coming in *unawares somewhere.* How, when, and where does it probably come in? It comes from several quarters, and first of all, by curtailing the buying power of all tax-payers.16 per cent. over and above the curtailment, were the tax 16 per cent. less. It tends to depreciate British goods in England, and still more in India, by making it more profitable to ship Indian goods to London and Liverpool, sell them for gold in London and Liverpool, and then exchange that gold for silver to buy Indian goods again, than it is to buy British goods with that gold, and ship the British goods as return cargo to India (indirect barter); and this is accomplished in part by draw-ing bills in India against the gold in London and Liverpool, and taking not only the silver rupees which the goods cost in India, but also 16 per cent. more, which is *actual profit* in silver rupees, in order to buy Indian rather than British goods. There are but two mercantile risks in this case: first, the risk of paying too much in rupees for goods in India, and second, the risk of getting too little in gold sovereigns for those goods in London and Liverpool. In other words, to go *only half way in the process or problem of indirect barter*, gives, in this case, a more certain profit than to go all the way; for if the process of indirect barter is completed, the merchant must run two more risks; making 4 in all, instead of 2 in all. To complete the barter, the Indian merchant must buy British goods with the sovereigns he gets for his Indian goods, and as he acts in a representative character on behalf of other (retail, or both wholesale and retail) merchants and consumers, he must then sell the British goods in India, which is his fourth and last risk. He may or he may not, make more than 16 per cent. profits in the shape of silver rupees, but *a bounty of 16 per cent.*, which gives so far a certainty, instead of the uncertainty attending the two last risks, is of course more desirable than the uncertainties of the two last risks; more especially as the price of British goods in India tends to fall through the loss of buying power in the hands of consumers, in consequence of this very bounty of 16 per cent., and still more, in consequence of a failure to complete the indirect barter of Indian goods for British goods. A market for Indian goods to the extent of the bounty of the 16 per cent. is thus furnished, and a market for British goods to the same extent, lost. In other words, tax-payers in India are required to pay this bounty of 16 per cent. *directly* by way of tax in money, and indirectly in the Indian goods they produce, but are partially compensated by a market, to the same extent, being found them for Indian goods, to the exclusion of British goods; thus *carrying up*, *by buying*, the price of Indian goods, and carrying down, by not buying, the price of British goods. But the purchase of bills on London and Liverpool absorbs only a part of the bounty actually paid, say, one half; the remainder of the bounty is disbursed to the buyers of bills or orders drawn in London on the office or subtreasury in Calcutta, but, instead of taking the form of a bounty actually collected and paid in rupees, it takes the form of a discount on rupees, or its complement, a premium on gold. These two sets of bills absorb the whole bounty, which is, I repeat, in all its forms, not only a tax of 16 per cent. on tax-payers, but a bounty of 16 per cent. to bill buyers for not completing, *pro tanto*, the indirect barter of Indian goods for British goods, by arresting it half way. Why do not the British and Indian merchants go still farther? Why do not Indian merchants who have sold Indian goods for gold in London stop more of their barter half way, take their gold to Calcutta, "sell" it for silver rupees, buy

Indian goods with the rupees, send the goods to London and Liverpool, and repeat the process many times, making, say 16 per cent. every time? In the light of my theory of money the question is puerile, but in the darkness of the commodity theory of money it is not. In the light of my theory, I need hardly say that such a thing is impossible, because, although the export of gold from London would not, *per se*, cause a fall of Indian goods, it would be an *infallible indicator*, that there was too much buying, for the exact reason that there was so much more buying of Indian, than selling of British, goods, that a fall must take place in the former, and a rise in the latter; and that the fall had actually begun. In rigorously exact terms of my science of money, it would demonstrate that *so much indirect bartering* of Indian for British goods, over and above taxes, *had been arrested half way*, in the hope of making a profit in money, by running only one half the mercantile risk, encountered by full and complete indirect barter, which is the end and aim of all trade, that a reaction had set in, which was forcing the half-perfected indirect barter towards perfect indirect barter. Gold and silver can only be obtained by merchants through a sale of goods, and if they sell goods they must purchase goods. This solves the problem of the Indian exchanges, and the solution is one that the human intellect is capable of understanding, after prolonged and careful study, and no other solution can be understood, because no other is true; that is to say no other is founded on facts. No science in the world is more complex than that of money, although it seems to people in general, and even to scientists themselves, to be very simple. Bees place their comb in geometrical curves, best calculated to distribute weight and pressure, in such a manner as to sustain the comb in its proper place; the beaver makes his dam like an able engineer, in a geometrical curve, best calculated to resist the pressure of water; a snake twice pulled by the tail out of his hole in the rock, into which he had entered head first, by a fisherman, returned the third time, and like an able general commanding an army of one, placed himself in coil, his best attitude of offense and defense, with his face to the enemy, and darting out his forked tongue in defiance, making discretion nevertheless the better part of his valor, retreated this time tail first into his hole, and having his rear and flanks protected, and a circle to move round in, retired slowly into his castle, while his enemy looked on with admiration.

Now the bees, the beaver, and the snake cannot demonstrate mathematically, but they have acted mathematically, and so have men in the use of money, converting, by means of money, direct barter into indirect barter. Moreover, men are on a plane high above other animals, for they are capable of demonstrating mathematically what they do mathematically, — to say nothing of their demonstrations of things done mathematically, and at the same time independently of themselves, — but it is the hardest of all demonstrations to undertake, because it concerns, not only facts outside of men, but *first of all* facts *inside of men*, their silent thoughts, arguments, conjectures, assumptions, and the illusions resulting from supposing apparent facts to be real facts. Some men, even to this day, maintain that the sun moves round the earth daily, in spite of all demonstration to the contrary, and most, perhaps all, men who read this demonstration will still insist that the problem of the Indian exchanges is not solved, because they will continue to insist that *money is a commodity*, and that the benefit conferred upon men by the invention of money is the substitution of "double barter," and not indirect barter, for single barter. The purchase of a bill on London with silver rupees in Calcutta is not in form a barter of silver for gold *exactly* in the same sense as a barter of silver for gold in bullion; but it is in reality the same thing, for, if the rupees were exchanged for gold in India, and the gold shipped to London, or if the rupees were sent to London and exchanged for gold there, or if gold were shipped to India, the result would be the same except, as before stated, that there would be an actual shipment of metal in either case which would be arrested at the point already indicated. This could not help to break the fall of silver, because it would put into the market as much silver as it would put into it of gold. The purchase of a bill is *in effect* a barter of gold and silver by the *substitution of an arithmetical debit* to the silver series, and *an arith-*

metical credit to the gold series, in exchange, of 16 per cent., in consequence of a forced reconstruction of the silver series with 16 per cent. less units, according to the commodity proportion of 18 : 1, instead of the geometrical one of 15½ : 1. It is the same thing as if the silver series were melted down and recoined at 18 : 1, before exchanging it for gold, and after the exchange it were melted down again and recoined at 15½ : 1. Precisely the same thing has always occurred between mono-gold and mono-silver countries, because it is either debit or credit to one or the other metal when the proportions of quantities of gold and silver in the bullion market vary more or less from the geometrical or mathematical par; but when bi-metallic France and her bi-metallic allies were in existence it was always possible, when gold was falling in bullion, to withdraw enough silver from the circulation of France and carry it to the bullion market to break the bullion or commodity fall of gold, the effect being doubled by taking out of the market 1 pound of gold *every time* 15½ *pounds of silver were put in*, and *vice versa*; thus keeping the geometrical or mathematical ratio and the commodity ratio near together. Some difference in exchange between mono-silver and mono-gold countries, founded on no real values whatever, might thus occur; but they were of no practical importance, and under general bi-metalism would have no existence. I desire to state here emphatically that I am no bi-metalist in the ordinary meaning of that word. I maintain that no empirical attempts ought to be made to introduce bi-metalism, universally or partially. Let the United States continue to coin at 16 instead of 15½, and let there be no interference with silver in India or anywhere else, and, above all things, let there be no bi-metallic congress in the interest of bi-metalism. Whoever undertakes to support bi-metalism against mono-metalism in a congress of bi-metalists and mono-metalists, *gives his cause away*, before he says one word, by the implied assumption that gold and silver are either bartered or double-bartered, and until he can not only demonstrate that they are not, but persuade *himself* and the *teachers* and *professors*, the men, if one please, who make monetary science, that the mathematical theory I have propounded is true, it is useless to argue the question; for, if gold and silver are bartered for commodities in general, in the same way they are bartered for each other, then their rise and fall in each other *is a rise and fall in other commodities.* It is useless to appeal to the fact that the purchasing power of gold in London may rise 25 per cent. before a banking and commercial crisis, and fall as much afterwards in many, and perhaps more or less in all, or almost all, goods, without changing $\frac{1}{10}$ of 1 per cent. in the bullion market, *because, logically and mathematically*, the cause is given away by the implied assumption; *the real facts* are overlooked, or masked by the assumed fact.

It is useless, also, to appeal to the fact that after the close of the civil war in the United States gold fell enormously, until the premium it bore was not more than ¼ of the amount by which it had then fallen in purchasing power in the United States, thus giving an enormous profit to those who had bought United States debt in gold, outside of the United States. The premium fell ¾ of the actual distance which purchasing power had fallen. It was very profitable to take gold out of the United States, or to buy bills on London, because, as the result of a fall in the premium on gold there was an enormous rise in the masked premium demanded by the buyers of bills, and those who exchanged paper for gold, to guaranty *against adverse variation of premium*, and rise in the purchasing power of the monetary unit, gold included. No premium of this kind could be demanded by the holder of gold residing abroad. If he sent or carried his gold to the United States he would lose enormously if he purchased, and therefore he neither sent nor carried it there; but the holder of gold in the United States who disposed of his gold, was obliged either to carry it abroad and buy as a merchant or traveler, or dispose of it at the premium offered; and that premium marked the *estimated average profit* of buying with gold outside of the United States: *the arithmetical premium* resolved itself into an average.

Such in effect, though not in form, will be the result of the arithmetical premium on gold in India and elsewhere. The profits made by the premium will be largely lost by *adverse variations in the price* *of goods*, and the losses of tax-payers will be largely recouped by the same variations. The gains and losses of producers, merchants, and consumers in England and the United States, caused by rise and fall in production, are *enormous* by the side of the *comparatively small* losses caused by the breaking of the bi-metallic chain. The grand fact is, that the end and aim of money is indirect barter, and through indirect barter, one way or another, comes compensation, more or less, for all monetary spoliation. Silver must rise and gold fall hereafter, as commodities, until they reach the old par of 15½ and 1, but they will do it at the cost of a fall in the purchasing power of silver, say 8 per cent., and a rise in the purchasing power of gold, say 8 per cent. Silver must go at last where it is current as money, and gold must go where it is current as money. The silver series of five thousand millions, with one thousand millions of paper and credit money in it, would require at least 480 millions more silver to extend it 8 per cent., and as ⅓ of the product probably goes into commodities like silver plate, etc., it would require a product of 720 millions, assuming that the dividend to be divided, which is the total of commodities, in mono-silver countries increases no faster than heretofore, and as speculation on the subject is out of place the presumption may stand, that the total of commodities in mono-silver countries will increase as much in proportion as that in mono-gold countries, but no more; and, allowing for this increase and waste and loss of metal, it will probably require from eight hundred to one thousand millions more silver to extend the silver series 8 per cent., and thereby raise general prices in mono-silver countries 8 per cent., while, in order to maintain them *afterwards* at 8 per cent., the *increased* quantity *thereafter* going to mono-silver countries will be sufficient. On the other hand, supposing gold product to average hereafter as before in relation to production and commerce in mono-gold countries, the whole product used as money in mono-gold countries will fall short by 8 per cent. of maintaining the mono-gold series at its present arithmetical position, in reference to the grand dividend total of commodities to be divided in mono-gold countries. In other words, add the mono-gold series when it is — 8 per cent. to the mono-silver series when it is + 8 per cent., placing between them five thousand millions of paper and credit tokens, and it will give the same dividend in commodities to each unit of the joint series approximately, as *now belongs to the gold unit* in mono-gold, and to the *silver unit* in mono-silver countries, but separated, *as each series now actually is*, and *by supposition will continue to be*, at the time indicated; prices will then be + 8 per cent. and purchasing power — 8 per cent. in mono-silver countries, while prices will be — 8 per cent. and purchasing power + 8 per cent. in mono-gold countries. Because, and *only* because, the invention of money was in the beginning, has ever since been, and always will be, not the conversion of single barter into double barter, but the conversion of *direct barter into indirect barter*, by the conversion of an *arithmetical series of units extemporized on the spot* by two barterers out of the commodities bartered, having no defined limit and varying at every exchange into an *arithmetical set of units* having *location outside of the commodities*, and a *fixed* limit, being by sellers carried away and kept as tokens to buy commodities, without at the same time offering commodities, the arithmetical + 8 of the silver series will balance the purchasing + 8 of the gold series, and the purchasing — 8 of the silver series the arithmetical — 8 of the gold series throughout the world. High-priced (+ by 8 per cent.) goods in mono-silver countries will bring low prices (— by 8 per cent.) in mono-gold countries, and will buy low-priced goods (— by 8 per cent.) in mono-gold countries, but *shipped to silver countries*, will bring *high prices* (+ by 8 per cent.), and be thus placed on the par of prices in mono-silver countries, which is + 8 per cent. above the prices they cost in gold in mono-gold countries; and thus, to the extent of indirect barter, there will be no spoliation. The several equations constitute a joint series of equations 4 in number, and the proportions or ratios a joint series of proportions or ratios 4 in number. I will now, in order to illustrate the compensatory action of indirect barter, assume the first cost of a parcel of goods to have been, in a mono-silver country 1080 silver dollars, coined in the geometrical ratio of 15½ and 1. Let the country be China.

and the goods a Chinese staple. We have first the equation, 1000 silver dollars + 8 per cent. in dollars to extend the series 8 per cent., making in all 1080 silver dollars = 5000 pounds tea: 5000 pounds tea = say £207 12*s.* in gold sovereigns — 8 per cent. in sovereigns coined at 1 : 15½, the — 8 gold making up arithmetical loss of gold; leaving net in sovereigns, say, £191 1*s.* 4*d.*: then £191 1*s.* 4*d.* = 7000 yards British prints bought with the gold money in London; then the 7000 yards British prints shipped to Hongkong = 1080 silver dollars coined at 15½ and 1, which is the original cost of the tea in China, leaving out profits and charges. High and low prices thus compensate each other through indirect barter. But the effect of this *slow movement* of 8 per cent. of silver to mono-silver countries, is to take away slowly and *keep away permanently* 8 per cent. of the excess of silver *from* the silver market, and to put *slowly* and *keep permanently* in the hands of every buyer in mono-silver countries 8 per cent. more money, relatively to the grand dividend of commodities there than he has now, while, on the other hand, the effect will be by taking 8 per cent. slowly out of the series of every buyer in mono-gold countries, to make at last 8 per cent. less money *arithmetically necessary* to make his exchanges of indirect barter, than now. Less money by 8 per cent. relatively to commodities than before, of gold, subsidiary silver, and paper and credit, will then be required in mono-gold countries than now, and this will keep relatively so much the more gold in bullion exchange. Gold will *therefore fall 8 per cent.*, while silver *is at the same time rising* 8 per cent. in bullion, and more or less spoliation will result in another form. The — 8 per cent. dividend value of the unit in the silver series will balance its complementary — 8 per cent. of silver quantity in the bullion market, and the + 8 per cent. dividend value of the gold unit its complementary + 8 per cent. of gold *coming into and remaining in* the bullion market. Assuming the grand dividend of commodities throughout the world to remain unchanged from the present at every place, that portion in mono-silver countries will have, say, *eight hundred millions more dividend tokens* outstanding against it than now, while mono-gold countries will have, say, one thousand millions less than now. The dividend token will therefore be worth, relatively, over 16 per cent. more than now in mono-gold countries, and at least 16 per cent. less than now in mono-silver countries, while, *indirectly*, the gold unit will fall 16 per cent. in mono-silver, and the silver unit rise 16 per cent. in mono-gold, countries. Carry $16 + \frac{84}{100}$ pounds of silver to the bullion market *at that time*, or, what is the same thing, exchange it *arithmetically* for gold sovereigns, and because silver and gold will stand at the old par of $15\frac{1}{2}$ and 1 you will get of gold $1 + \frac{8}{100}$ pounds in sovereigns: buy goods with the sovereigns, and you have 8 per cent. more goods than you can now buy with the $1 + \frac{8}{100}$ of gold. Thus, by selling goods for silver in India or China, and converting it into gold, either directly or through a bill of exchange indirectly, you will get not merely 16 per cent. more goods than you can get now, but you will get 32 per cent. more; in other words, 16 per cent. above the old average under bi-metalism. Silver will have thus traveled a distance of 32 per cent. in all. It will, by lengthening its series, have risen arithmetically + 8; in bullion + 8; in quantity procurable with the same amount of goods + 8, and *through* this latter gain in quantity it will have *indirectly* risen + 8 above gold in dividend power, which is the complement of — 8 in quantity, of gold in bullion. The changes which have taken place *up to this time* in "values" are *all* in the bullion market, but at that time the bullion market will have changed back again to 15½ and 1, at the cost of a fall of 8 per cent. purchasing power in the unit of the silver series, and a rise of 8 per cent. in that of the unit of the gold series. The restoration (rise) of the commodity ratio of 15½ and 1, or rather the coincidence of the geometrical or mathematical ratio *fixed* at 15½ and 1, and the commodity ratio, varying necessarily at times more or less from the geometrical ratio, will balance the present fall of 16 per cent. in silver, while the gain of silver arithmetically in quantity in reference to the goods it distributes 8 per cent., added to the corresponding fall of gold in quantity, will make any parcel of goods in India, which is now worth another parcel of goods in England, worth, leaving out of consid eration profits and charges, not only the latter, but, in addition, + 16 per cent. more of the same kind, *provided always, and only so far as*, Indian goods are actually sold for silver in India, exchanged for gold, and the gold exchanged inversely to the present movement for English goods in England, or, in other words, only so far as there is no indirect barter. On the contrary, a parcel of English goods in England now worth another parcel of Indian goods in India, leaving out profits and charges, will be worth only $\frac{84}{100}$ of the parcel of Indian goods, if the British parcel is sold for sovereigns, the latter exchanged for rupees, and the rupees laid out in India in the purchase of the Indian parcel, thus making a difference of 32 per cent. in all between the parcels, and a net loss of 16 per cent. against the British parcel; but operations of this kind will be limited as they are at this time, money being a process and not a commodity. Counting fall of silver, now, 16 per cent., and rise of gold 16 per cent., there is a range of 32 per cent. and a net debit to silver of 16 per cent., whereas the net debit hereafter will be 16 per cent. against British goods through gold. If high-priced Indian goods which have cost relatively 16 per cent. more arithmetically than their equivalent in low-priced British goods, go to London and Liverpool, they will be sold to British consumers at 16 per cent. less arithmetically than they have cost, because gold and silver money, expressing as they do mathematically the value relations of other commodities only, have themselves no more commodity value than paper money; they are the units of an arithmetical series distributed in minor parts to buyers, in which they compute and state, in buying and selling, the prices of commodities, and deliver them as money proportions indicated by prices, to sellers in exchange for the commodities; the sellers afterwards taking the place of buyers. Indirect barter will, in the future, for the most part, compensate for the fall of the silver unit and the rise of the gold unit in dividend power, as it now compensates for the fall of silver in bullion, but the "exchanges" will be turned upside down from their present level. It will be impossible to make equal and exact compensation to losers, or obtain equal and exact restitution from gainers, but compensation and restitution will be made, nevertheless, as it is made now to consumers *who pay bounty*, and by producers *who take it;* to buyers who lose by fall in purchasing power, and by sellers who gain by fall in purchasing power. This theory of money calls for a junction of the two *metallic arithmetical series* all over the world, a *limitation of all paper units*, as nearly as possible, in one unvarying proportion by metallic units, and because a *bank-credit unit* is *worth* a paper unit or metallic unit, and is *brought into existence* and given buying or dividend power with *vastly more facility* than a paper unit, the issue of a paper unit being now prohibited by law except under many formalities, and for the most part subject to the deposit of a security worth more than itself, the bank-credit unit ought to be arithmetically limited by the metallic unit, in the same manner with the paper unit, *as far as possible if steadiness be really desirable.* When the exchanges are turned upside down, and goods in India are worth, *through* money, 16 per cent. more in British goods than now, the London imperial office which sells an order on the Indian treasury in Calcutta, payable in silver, will get a premium of 16 per cent., instead of submitting, as now, to a discount of 16 per cent.; making in all a distance of 32 per cent. traveled by the unit of exchange. India will have then, as it has now, a tax to pay for support of Indian government, and perhaps interest on Indian debt, to the imperial office in London, through the local office in India. Trade will be indirect barter then as it is indirect barter now, saving and excepting the silver which will go to India, *to add 8 per cent. arithmetically to its silver series.* Silver will *begin*, and *continue*, to fall, as a unit of purchasing power in mono-silver countries, down to 8 per cent.; prices will fall locally to the loss of shippers of silver as silver is distributed locally (as after the working of the American mines in the sixteenth and seventeenth centuries), to rise afterwards generally as the distribution is extended. This loss will partially balance gain on the side of Indian goods, and will be a debit item to be made up out of mercantile profits. To pay the debit balance in goods, due from India to taxes and interest, through the imperial government, the imperial treasurer draws an order on the Indian treasurer. He might *possibly* undertake a mercantile business on imperial account, buy Indian goods, ship them to London and take the *chances* of a mercantile adventure, with the hope of getting 1 pound of gold in London for every 15½ pounds of silver he laid out in goods in Calcutta, and enough more gold to pay all charges, but he would probably lose more for the tax-payers than he could save by such an operation, were he to undertake it, and it is therefore better, upon economical principles, if one really undertakes to argue such a question seriously, for the tax-payers to take their chances of recoupment in the manner I have explained, than to take mercantile risks themselves through the imperial government. But little silver and gold is now sent from India to England, and there is more profit in depressing silver in the bullion market than in sending it to India, but in due time silver must go to India and other mono-silver countries until the metallic redistribution going on is completed, unless it be conventionally arrested. Indirect barter pays the Indian debt now, and it will pay it hereafter when silver has risen. Whether the imperial treasurer draws, as now, on the Indian treasurer, selling his orders to bankers who act as intermediaries for him and the merchants, or to merchants directly; or whether the Indian treasurer buys bills on London with bankers' guaranty, *indirect barter is the process* by which the problem is now, and always will be, worked out. If India had no debt to pay in London, and goods only were sent from either side, the Indian goods would be at once indirectly bartered for the British goods, and the latter for the former. The Indian goods would be bartered for British goods, *through* the units of the arithmetical gold series in the *character of sovereigns*, Bank of England notes, and "bank credits," and the British goods for Indian goods through the units of the arithmetical silver series in the character of rupees, bank notes, and "bank credits." But when, as now, India has a debt to pay in England, the goods required to pay that debt are so much of Indian goods bartered in excess *of British goods* bartered. The indirect barter of the Indian goods sold by tax-payers for silver, in excess of British, must therefore be, and actually is, accomplished by buying with that silver other Indian goods which are sent to England and sold, and so complete the indirect barter. Thus, leaving out as far as possible the machinery of bills, shipments, exports, imports, etc., in order to illustrate my theory of money by concentrating all the light there is to be had on the monetary and commodity exchanges, the Indian goods which pay the tax are indirectly bartered for miscellaneous goods in England through tax-payers in India, as the first set of intermediaries; government officers in India as the second set of intermediaries; imperial government officers in England, who draw orders on the Indian treasury, as the third set of intermediaries; bankers who buy the orders, merchants who buy the orders, or exchange growing out of them, from bankers, and with the proceeds in rupees buy and carry to England Indian goods, as the fourth set. The Indian debt holders and imperial officers who receive sovereigns, checks, or Bank of England notes, get nothing by the extra tax of 16 per cent. paid in India, the local government gets nothing, and the imperial government gets nothing, but the 16 per cent. is divided between the bankers and merchants in such proportions as they in effect agree upon, and the process of indirect barter is completed in England by the agency of four more sets of intermediaries, who finish the indirect barter of the Indian goods for the miscellaneous goods bought by and through the holders of Indian debt and imperial officers. The Indian merchants are the first set of these intermediaries, the merchants of all the miscellaneous goods are the second set, the debt holders and officers who buy and consume, and others who buy and consume *through* them, the miscellaneous goods, are the third set, and the buyers and consumers of the Indian goods, the fourth set, of intermediaries; while the consumers of the 16 per cent. extra (bounty) of Indian goods do not make, so far, any indirect barter with the debt holders and officers, but indirectly barter the 16 per cent. extra of Indian goods, or at least all there is of it left to be bartered after going through all the uncertainties of the preceding barter, with another and entirely different set of consumers of miscellaneous goods. Here are 8 sets of intermediaries, and as to the excess or bounty of 16 per cent. an additional ninth set. The tax-payer is not one of these intermediaries. He has performed the first act of indirect barter by selling his Indian goods for the tax money, and he ***assigns his right to complete the indirect barter by the purchase of other*** Indian goods, to the local government; the latter to the imperial government; the imperial government, by sale of orders, directly to merchants, or indirectly to merchants, through bankers; and the merchants, through the imperial government, assign the right to the debt holders and officers, who, through the right thus assigned, complete in England the second act of indirect barter, thus complementing the first act of indirect barter performed by the tax-payers in India. But ***thus far*** the indirect barter required to pay the tax has ***carried no Indian goods*** to England: it is thus far only the first half of an indirect barter of the Indian goods sold in India by Indian tax-payers for miscellaneous goods to be bought afterwards in England by, and through, the debt holders and officers. This barter thus far ***carries no goods***, as it certainly carries no money, out of India to England. Nevertheless the debt is paid and consumed in England, and it is paid and consumed ***in the character of a debt***, always and continually. How ***can*** the illusory theory that gold and silver are commodities, bartered, and ***therefore double-bartered***, for other commodities, solve the problem? The true answer is, that it does not solve it at all, but ***attempts to solve it perfunctorily***, by declaring ***dogmatically***, ***without any analysis***, that all trade is ***direct barter because*** gold and silver are commodities; and that it *is double barter,* because gold and silver commodities, actually or convertibly, are in all cases intermediaries. If this theory be true, gold and silver *may* leave India and go to England to pay this debt, being, in fact, the very thing due.

But neither gold nor silver leaves, because silver has already, in effect, left for England, and been exchanged there for gold, and the gold paid over to the government debt holders and officers. If gold and silver are really bartered as commodities, and the word Commodity is not a term applied to money *as a mere figure of speech,* founded on none but illusory facts, the debt is paid, now and thus. It is useless to reply that no metal has actually left India and gone to England to pay the debt, and therefore the debt remains unpaid, and can only be paid with goods. It is false to assert that the debt remains unpaid *if money be a commodity, because barter of goods can take place without removing them, and the barterers need not handle them at all.* The authorities in India collect a tax in India in silver and cover it into the office in India; the imperial treasurer barters that silver for gold which he covers into the imperial treasury without actually handling it in London. He delivers the bartered gold to debt holders and officers in England and the government office in India delivers the bartered silver to merchants without moving it. This is *simple direct barter,* and amounts to the same thing as if the silver were sent to England by the local government, delivered to the imperial treasurer in London, handed by him to the debt holders and officers, and by them to merchants in exchange for gold. Single barter of silver for gold would be accomplished in the last case, but it is accomplished quite as effectually in the first case, and if gold and silver *money* were really commodity the debt would be paid, just as England is now paying the United States *with commodity gold*, for some of the raw material and breadstuffs she is getting. In point of fact, however, the payment of the Indian debt *is not postponed* by sending silver to London, as England now postpones payment to the United States to some extent, by sending gold money instead of goods in order that the United States may accomplish at a future time the indirect barter *for which she is not now prepared*; for instead of sending the silver money, which is not current in England, merchants barter it while in the local office, through the intermediation of the imperial office, *with bankers and merchants in London for gold, and thus the debt holders and officers get the gold*, and the merchants the silver, and the latter buy Indian goods at their leisure, and by so buying pay the Indian indirect barter debt, as American merchants, *at some future period*, will be the intermediaries, by whom English merchants will, by selling English goods for gold, accomplish the indirect barter of English for American goods, which will pay the *commodity debt* England *still* owes the United States. To carry silver from Calcutta to London where it is uncurrent, would only pile it up in the bullion market, where it cannot be used, and, therefore, if carried there it would be at once carried back to India. The important difference between carrying and not carrying it away from Calcutta, and back again to Calcutta, is that, by not carrying, expense of carrying is saved, and the form merely, *not the substance*, of the debit to silver is changed. If carried to London each unit would be constructively, not actually, debited 16 per cent. in silver metal, and to pay this debt would subtract 16 per cent. from the units in its series; each unit would owe to the unit of the gold series exchanged for it 16 per cent. of silver, and this metallic (in other words, geometrical) debt would be paid by a *constructive recoinage* of every unit in its series offered for a gold series, with 16 per cent. *more* silver metal, which would *diminish its series by 16 per cent.*, while if bartered in Calcutta the debit of silver would be paid in the same manner, constructively, by recoining *the gold series with 16 per cent. less metal to each unit;* thus *extending it arithmetically* 16 per cent. But as silver is not directly current in London, nor gold in Calcutta, the gold and silver, whether handled or not, are actually bartered, and the series of each is reconstructed actually in exchange for each, so that in London the gold series, being the first member of the equation of exchange, and the first member of the arithmetical proportion, silver *is debited arithmetically* 16 per cent., which 16 per cent. is added to its series in exchange and in proportion, while in Calcutta, silver being the first member, gold *is credited 16 per cent. arithmetically* and proportionally. According to my theory *gold and silver are commodities in bullion exchange* under any and all circumstances, and at the same time money, and if either metal is, while still bullion, uncurrent as money, where the bullion exchange is, *that metal is not money there.* To be *full and complete token money* in any place, varying commodity standard for the unit must be abolished entirely, and a *geometrical unvarying standard* established in its place. By commodity standard I do not here mean a pound standard, or an ounce standard merely, or any commodity standard of weight as commonly understood, but I mean here by commodity standard, as stated in the beginning, the quantity above average we are compelled to add to any given quantity of a commodity, when by increase of its total mass or quantity it is said to fall in value, and the quantity we are allowed to subtract, when it is said to rise in value. To abolish this kind of standard in reference to any commodity used as money, is indispensable, and it is *actually abolished in all cases.* The reason is that *exact geometrical* apportionment of weight takes the place of standard: the actual *variations* are as a whole not in money as a commodity but only in the grand dividend of all commodities, and these are slight compared with the size of the vast whole; but in certain kinds of commodities in certain places the local variations are sometimes very great. In the grand arithmetical series as a whole the variations are *slight by reason of its great length;* but in the local series the variations are arithmetically great through paper money and bank loans, especially in England and her colonies and the United States. These variations may, in all cases, by *generalization be reduced mathematically to two:* first, the variations in the geometrical dividend of commodities; and second, in the arithmetical divisor. The holders of all the money in the world might be said to be worth all the commodities in the world, and the assertion would be approximately true, as the holders of railroad stocks are, subject to debts and liabilities, worth the railroads. In this sense, *the seeming paradox of the old Mercantile Theory, so called*, might be said to be true. Again, it may be truly said that money has *no commodity standard*, but only a geometrical apportionment of commodity *in order to fix and maintain steadiness in the arithmetical series which is the divisor;* and hence, having no commodity value in itself, it is worth no other commodity value,—in other words, quantity, —paradoxical as the assertion sounds. For this reason it is indispensable to fix a geometrical apportionment of weight for the units of gold, and also for the units of silver, and thus a geometrical proportion between the units of each metal *necessarily follows* from using the two metals, *whether separately or together.* Metallic money *is indispensable*, says the common sense of mankind, and the common sense of mankind thinks that it knows that fact, and that it is enough to know that fact. But this is a grand fallacy; for if it were not, mono-metalism would be abandoned, bi-metalism generally established, and arithmetical units of *bank and government debt* be limited arithmetically by geometrically-proportioned metallic units of money.

Silver, by reason of its *total weight*, may be correctly designated as a monetary nuisance to Western nations, especially the United States, and Great Britain and her colonies, *but it need not be handled at all*, or at least only when it is actually wanted. Most of the calls could be answered in gold, and would be for the most part in the countries named, under general bi-metalism, and a theory of money founded on facts. As I have already remarked, the unit of each metal must be geometrically proportioned *out of the total mass of metal offered for coinage;* each unit must have a certain weight to make geometrical proportion *perfect*, although, theoretically, *different weights might be used if the total metal* were distributed to the units of the series *so as to make the number arithmetically the same in either case.* But whether there be universal mono-metalism, or universal bi-metalism, there must be a geometrical apportionment of weight to the units of each series, and whatever that apportionment may be, because all arithmetical monetary proportions *are reducible into each other through indirect barter*, and also because geometrical apportionments of weight must be changed very slowly, if at all, by repeated recoinages, it is indispensable, in *order to avoid monetary*, and through monetary, geometrical, *spoliation*, in the payment of debts between mono-metallic countries, like India and England for instance, to *take the chances of a mercantile adventure*, and pay the debt out of the proceeds, possibly not only without loss, but with some profit; possibly without loss, but with no profit; and possibly with little, and possibly with great, loss; or submit at once to a fixed amount of monetary spoliation, as the best choice under all circumstances. The general or abstract theory of the geometrical commodity value of the arithmetical unit of money, as one unit of the *whole series*, is, that it is that *undivided portion*, to be found by dividing that total by all the units of the series, *of the total of commodities to which the series relates;* but as abstract mechanics become applied mechanics this undivided portion practically becomes the particular commodity or portion of commodity given to buyers by sellers in exchange for the unit, or any number of units. The action of sellers in carrying up prices is reacted against by buyers; the action of buyers in carrying down prices by the reaction of sellers in carrying up prices; and the joint action of buyers and sellers of any commodity, by the reaction along the arithmetical line of all buyers and sellers, the result being, analytically, a series of equations and proportions. of which the equations can be converted into proportions and the proportions converted into equations. A certain number of units of the arithmetical sub-series in use is exchanged, say, for a parcel of goods, and the receiver of the units of money who parts with the parcel of goods in exchange for the units, exchanges the same units for another parcel of goods. Thus we are analytically at the beginning of the process as now developed, and we have the first equation, units = a parcel of goods; and the resulting second equation, same units = another parcel of goods. The man who parted with the units of money in exchange for the first parcel of goods completed his last half of indirect barter, while the man who took the units and gave the first parcel of goods completed his first half. Every seller, therefore, *begins and finishes the first half of indirect barter*, while his buyer is completing the last half, each indirect barterer estimating commodities in proportions whose units are arithmetically limited by the money used. The arithmetical series employed is limited *arithmetically* by the total number of units of money received for the first parcel of goods, and the goods as a geometrical whole are limited geometrically by the two parcels of goods, subject to the variation from exact geometrical proportion, caused by mental estimates of what, for want of a more correct term, goes by the name of intrinsic value. The series of proportions resulting from this comparatively simple, and apparently very simple, problem of indirect barter of two parcels of goods having presumptively the same intrinsic value, because they exchange for the same money, is really a very complex series of proportions. The first proportion in money is, say, 100 : 100; the second proportion in goods is, 1 parcel of goods by measure, weight, or both, geometrically : another parcel of goods by measure, weight, or both, geometrically; the third proportion is, intrinsic value of first parcel of goods as mentally estimated and agreed upon by buyer and seller (thus fixing, or, as it may be called, measuring, the quantities to which the money is entitled): intrinsic value of the second parcel of goods estimated in like manner. These last two proportions, therefore, practically come together and form one complex proportion. Leave out intrinsic value, which is purely a mental estimate in addition to and over and above the mere geometrical proportions of commodities, and we have none but geometrical proportions left, which, to speak with rigorous, that is to say, with mathematical, exactness, is what we have in the two kinds of metallic money, gold and silver, out of which we mentally, without knowing it, eliminate intrinsic value, in order to avail ourselves of exact geometrical proportion in order to limit a series of metallic units, as *arithmetical* intermediaries between the quantities which have not only geometrical proportion, but the enormously complex qualities of intrinsic value, as we call it; the perception of these qualities being a mental, or, as I may call it, to make it more readily comprehended by some minds, an ideal or metaphysical estimate founded mostly on experience, and in some goods requiring a long and careful education. If barter were practicable in a direct sense, every community of barterers would *naturally* fall into the habit of using a *mentally limited series*, having a definite number of mental units, because they would naturally run into the habit of calling a particular quantity of a commodity *by a definite number of units;* and this *would itself furnish an arithmetical series*, the sum of whose parts would be the units *mentally apportioned to each quantity* of commodity; and *from this beginning*, not only a localization, but an actual arithmetical limitation of the mental series (a development into money) would follow, with the absolutely *invaluable and inestimable result of a token value in the unit;* thus making it over and above its function of mental unit in an arithmetical proportion, *a tangible token unit*, possessed of the power or right of being exchanged for geometrical + intrinsic, values in its due arithmetical proportion. That this is exactly what we have in money I have proved, first, by actual facts outside of man himself; second, by facts inside of man, or, in other words, metaphysical or psychical facts; and third, by mathematical facts. Any one who chooses can pursue the investigation in directions almost innumerable, and at every point of the compass, so to speak. I will indicate a few of these here. If original direct barter were in use, and mankind, by supposition, civilized, the extemporized abstract mental series of each community, having no *actual* limitation in its number of units, would *mentally tend towards limitation,* in the manner pointed out, but the series of each community would differ in length, and also in the name of the unit, nevertheless. In making exchanges between members of different communities, how could the longer total mental series of one, with its resulting longer sub-series of units in every proportion, be made to harmonize with the shorter total series of another, and its resulting numerous shorter sub-series, so as to make exchanges possible? I answer, that commodities brought from the long series would be bartered in the short series, and commodities brought from the short series bartered in the long series, and the commodities received in exchange would thus be carried away and bartered in a series arithmetically inverse to their own. I will now look in another direction, and take another case with money as we actually find it.

A merchant in Liverpool buys goods in the gold pound series, which is only $\frac{100}{484}$ the length of the pound series, as it would be if every unit in it were geometrically proportioned anew, so as to make 4 and $\frac{84}{100}$ of units for every unit there is now, every paper and credit unit in excess of gold being multiplied in proportion. His total series stands to the American series as 100 to 484, and his sub-series in like proportion to the sub-series of the American merchant. He sends to the American merchant goods to the value of one thousand gold pounds. The British series is mono-metallic gold, and such also is the American. The American became such, practically, by coining silver long since at a geometrical proportion of its own of 16 instead of 15½, and thereby lost all its silver and became practically mono-gold, as it still is, notwithstanding a recent law for the coinage of more silver at 16, after its old proportion. If silver coinage goes on long enough it will practically become a mono-metallic silver series, as it is now practically a mono-metallic gold series, like that of France. The American merchant keeps, perhaps, a pound account and a dollar account, and the £1000 gold sub-series of the British merchant is, in the dollar account, *arithmetically* credited 384 units to be added to every 100 units found in it, each unit in the converted series losing, inversely and equally, $\frac{384}{100}$ out of each $\frac{484}{100}$ of the whole purchasing power, without the intermediation of a single coin. The goods have been *taken out of a short series, and bartered in a long one.* In like manner the American merchant sends to the Liverpool merchant goods bought in the dollar series, the sub-series amounting to $4840, thus bartering out of a long into a short series, not a dollar in coin, checks, or bills appearing. Every unit in this series, when it gets into the short series, is *arithmetically* debited $\frac{384}{100}$ of units for every $\frac{484}{100}$ found in it, and, potentially and inversely, credited with $\frac{384}{100}$ of purchasing power in addition to each $\frac{100}{100}$ it possessed before, precisely as in the case of the mental units of the extemporized series in primitive barter, where goods were bartered out of a long into a short, and a short into a long, series. There is a vast difference between this case and that of primitive barter, nevertheless, but where does it lie? It lies partly in the fact that the extemporized series was on either side, at best, *fluctuating and unsettled*, but in the British and American series, although none but mental units are employed, prices are stated and maintained *with precision.* The American and British goods are bartered for each other, but they are bartered out of one fixed series into another, where the fluctuations are *comparatively* slight, although *sometimes disastrous.* But there is another difference of vast importance. What is it? It is the fact that the American and English merchant, before they can get goods again, will each have to *sell the goods* he has taken, for the units of a series which do not merely possess the function of abstract units in a proportion, but the all-important function of purchasing or dividend power, which, independently of actual commodity values, must rise and fall more or less, but actually rise and fall disastrously, for both merchants, producers, and consumers, *for want of a true theory of money,* as, turning in another direction, I will show in the following cases. Merchants in London, New York, and largely throughout Great Britain and her colonies, and the United States, pay *by checks against bank balances*, which are credits to them and debits to banks and bankers, without moving more thar half of 1 per cent. in metal. Bankers and mer chants *call* this a dealing in bank credits. Perhaps they have got the idea and the name from writers on Political Economy and Monetary Science, for the most part. The term is a *very misleading*, and in fact *an absurd one*, even if money is *really a commodity* under any form, for if metallic money is a commodity which bankers always keep in a quantity sufficient to meet demands, then every check on a bank paying specie is really an order to deliver a commodity kept in store for the owner, and is bartered by him for the goods he buys with his check, the same as if he had wheat, flour, provisions, iron, or copper in store, and gave an order for them. But writers upon money do not *really*, that is to say, *consciously*, mean that money is a commodity; they use the term, as the only one the illusory theory of money offers, *in the absence of analysis.*

The merchants who draw the checks *are not direct barterers*, because money is not a thing which is, or can be, bartered, but they are indirect barterers, not through banks, bankers, or clearing houses, separately or collectively, *but through the units of an arithmetical series*, the total of which is *the total* of all the deposit credits stated in their checks, while each check states the units of a sub-series belonging to the drawer, with which he is completing the last half of indirect barter while his sellers are completing the first half. The fluctuations *in the total series* are enormous, caused by bank loans made, not *in proportion to a metallic reserve*, arithmetically limited by means of metallic geometrical proportion, but for the most part *without any limit*, save the discretion of banks and bankers, while paper issues are limited now, not perfectly by metal, but by stringent legal provisions. There is no such thing as "economy" of metallic money in any *true* sense; it is a misapplied term resulting from the illusion that metallic money is a commodity, when it is really a process in which numerous complex mathematical problems of exchange are worked out, largely by means of the metallic units of weight geometrically proportioned and constructed out of the commodities gold and silver, *the only market of which is the bullion market*, and jewelers', gold and silver beaters', and plate-makers' shops. The *handling* and *keeping of money* is what is *actually economized*, and not the commodities gold and silver; and this economy is of enormous utility and advantage to all men. Indirect bartering is *greatly facilitated* through banks, over and above the economy of handling and keeping, and independently of the good effects which might follow from loans metallically regulated, and the bad effects which follow from loans, because they are not so regulated. From the illusory theory that money is a commodity, eminent writers and economists, and none with more force than Mill and Price, have argued that, as money is a commodity, a bank deals mostly in credits, because so small an amount of gold and silver is actually called for by customers, but this *must be* a mistake, even if *money is a commodity*, because a commodity *can be bartered in store* as well as out of it. Nevertheless, such is not merely their inference drawn from facts, *as they see them*, but it is the opinion of writers generally, and of intelligent bankers and merchants who have read and thought enough to frame or to adopt a theory. This inference, being adopted, has become a canon of monetary science, and from that canon is drawn the inference that, inasmuch as money is a commodity, and a bank deals in credits (that is to say, I presume, credits for a commodity, or, perhaps, abstractly "credits," as there has never, to my knowledge, been a definition of the term), it is like merchants' credits, say those of the British and American merchants, before mentioned. But this, I repeat, is a *grand fallacy*, *even under the commodity theory itself.* The British and American goods were bartered directly without the aid of any purchasing power, save goods ; drawers of checks, it is said, in like manner barter (if they barter directly at all) either for a bank credit, or gold or silver, and if for a bank credit, it is *a substitute* for gold or silver, or bank debt in the shape of bank notes in the reserve. This assertion has a plausible sound without analysis, but the *actual fact* is, that the checks, through, and in connection with, the aid of deposit credit, have purchasing power, precisely to the same extent as if the gold or silver *were actually weighed out and delivered*, whereas in the barter between the merchants there was no such purchasing power. There is no analogy, therefore, between the cases, but it *passes for analogy* through the overpowering illusion that money is a commodity Gold and silver *are* commodities; they possess "intrinsic value;" a commodity exchanged by weight or measure for another *is* bartered for it; but gold and silver as money *are* exchanged by weight for other commodities, and therefore, says the illusory theory, they are commodities. The fallacy *latent* in the premises is overlooked, and that fallacy is the omission of the fact that while gold and silver are *undoubtedly* commodities, and may be said, if one please, to be *used as commodities* in money, the *use* of a thing is by no means the *barter* of that thing; barter of a commodity *gives rise* to value in barter; but the *use* of the commodity after it is bartered is *invaluable;* that is to say, it cannot be valued, unless it (the use) is loaned, and in that case the use alone is valued and paid for, while the commodity itself has none but potential value until it is *itself* actually valued. I will now turn in another direction and look at the metallic case of France and the United States. France has a very large amount of silver money geometrically proportioned at 15½, while the United States has much less, geometrically proportioned at 16, but worth, interchangeably, no more than if proportioned at 15½. 15½ pounds in the *joint gold and silver series* in France is *worth 1 pound of gold in the joint series;* but outside of the series, and in bullion, it is worth only 1 pound of gold — $\frac{16}{100}$ of 1 pound of gold; and while, *in* the series, 1 pound of gold is worth *only* $15\frac{1}{2}$ pounds of silver, outside of the series, and in the bullion market, close by, it is worth $15\frac{1}{2}$ pounds of silver $+ \frac{15\frac{1}{2} \text{ pounds of silver}}{100} \times 16$.

What but an *overpowering* illusion can maintain, in opposition to such facts, the fallacy that gold and silver are commodities, bartered as money, just as they are bartered for each other in bullion? The illusion is maintained, in spite of these facts, by the explanation that the silver has really a token value as money in this case to the amount of $\frac{16}{100}$ only and commodity value to the amount of $\frac{84}{100}$. The latter proportion is *undoubtedly true of bullion exchange*, but has no application to money exchange. It is impossible for a thing to have commodity value and token value at one and the same time: one value contradicts and excludes the other. If silver money in France has only token value in France to the amount of $\frac{16}{100}$ of its total, then follows the absurdity that it has token value to the extent of $\frac{13}{100}$ only in the United States, and at the same time in India and China to the extent of $\frac{16}{100}$, as in France; but I have demonstrated that such is not the fact in India, save, and except only, that the value of *all money* is token value in the sense defined; that (token) being the only word at hand which has survived the effects of monetary illusions, which seems to be adapted to express, at least in some degree, what money is. But there is *some* truth in the assertion that money has token value in France to the extent of $\frac{16}{100}$, because it has token value *only*, and the assertion therefore contains, mathematically, $\frac{16}{100}$ of the *whole* truth. But there is still another sense in which the assertion may be called true. Silver in the mono-silver series of India is, through goods indirectly, worth 15½, but not directly and interchangeably, as in France, while precisely as in France it is worth in bullion 16 per cent. less. What is the cause of the difference? The cause of the difference lies in the fact that silver has free coinage in India, because she has *no other* metallic money, while France, having both gold and silver, has been *obliged* to restrict coinage of silver in order to keep gold enough in her series to answer all monetary demands from outside. Silver and gold are always commodities in exchange for each other, and one definite quantity of either furnishes a *standard measure* for the other, but when, through demonetizations carried to the point of destroying the continuity of bi-metalism entirely, as is now the case, the metal which is made the "cheapest" in the market, that is to say, greatest in quantity proportionately, necessarily becomes a *standard of profit* in a certain sense, more especially to the other, until the surplus is distributed permanently as money, and rises in the market, when the other becomes standard of profit in turn to the other. Gold is the commodity standard of silver, and silver the commodity standard of gold at any and all times, because rise of quantity is fall of value, and fall of quantity rise of value. The question now is, which has risen, or which has fallen, in bullion, or has one risen and one fallen at the same time? Of course it would be absurd to affirm that both have fallen and both risen at one and the same time from one point, because it is impossible to conceive of one falling or rising, unless the other be assumed to be stationary at a particular point. Gold being least in total weight and mass in the market, and at the same time worth all the silver in the market, if money is a commodity and 1 ounce gold now = 18 ounces silver in exchange, either silver has risen in quantity throughout the world by $2\frac{1}{2}$ ounces for every ounce of gold, while gold has been stationary, or gold has lost at least $\frac{16}{100}$ of an ounce for every $15\frac{1}{2}$ ounces of silver, while silver has been stationary; or gold has lost $\frac{8}{100}$ and silver gained $\frac{8}{100}$. To contend, therefore, that gold has risen 16 per cent. in all commodities of the world is in reality to maintain, although the contending party may not know it, that gold has fallen geometrically short in proportion to all the commodities of the world by some 2400 millions; and to contend, on the contrary, that silver has fallen in all the commodities of the world 16 per cent. is to maintain that silver has increased in excess of all of them as a whole by at least 2000 millions. If copper in market were to increase in quantity 16 per cent. relatively to itself, it would only increase relatively to the geometrical total of all commodities, perhaps much less than the $\frac{1}{1000}$ of 1 per cent., being only *one* among thousands of commodities, while in consequence of falling off in the demand for the article, because the wants of consumers had been supplied, it might fall in price more than 25 per cent.; but to *make gold fall off in quantity 16 per cent., relative to every other commodity in the world*, is necessary in order to *actually* accomplish the feat of making gold rise in purchasing power as a commodity 16 per cent. all over the world; while on the other hand it is requisite to make silver gain in quantity in exchange for all commodities, 16 per cent., in order to fall 16 per cent. in purchasing power. The *money* price of copper is *largely*, but not *entirely*, determined by quantities in market, but the *barter price of silver* is determined *entirely* by *its own quantity*, and the quantity of gold in the market. The price of copper in market *may* fall 25 per cent. *because* its quantity in market has risen *only* 16 per cent., and its price in money *may* rise 25 per cent., although its quantity has fallen off only 16 per cent., while, on the contrary, if gold falls off in quantity in market 16 per cent. it rises in silver 16 per cent. with *geometrical exactness*, and if silver rises in quantity 16 per cent. in the market it falls in gold 16 per cent. with *geometrical exactness.* If copper falls 16 per cent. in market as raw material, the tendency, if the fall of the raw material continues long enough, is towards a fall of 16 per cent. in the manufactures of copper, but if the unit ounce of gold rises in bullion geometrically *in point of quantity* 16 per cent., its unit ounces, in the shape of gold sovereigns or dollars, *tend to fall in quantity* 16 per cent. in reference to commodities, by *dockage* of its mon etary series some part of 16 per cent., either carried into bullion out of circulation or kept in bullion instead of being carried into circulation, and, on the contrary, if in point of quantity the unit ounces of silver *fall* geometrically in bullion 16 per cent., the unit ounces of silver in the shape of coined dollars and rupees, or uncoined Chinese money (sycee silver), *tend to rise in quantity* in reference to commodities by lengthening of the silver series some part of 16 per cent.: the more metal in market the less in circulation as money, and the less in market the more in circulation as money. Copper is *first marketed* when it is sold as raw copper, and a second time, when it is sold as manufactured commodity: commodities *are sold* to be *used* as such, or to go *into* fixed capital in ships, houses, etc.; but gold and silver have *three* markets. The first market is when they are bartered directly for each other: a thing which is bartered *directly* for another thing cannot be at the *same time* bartered *indirectly* for it, nor can it at the same time be bartered indirectly for something else. The man who barters gold for silver does one half the bartering; and the man who barters that silver for the gold does the other half of the bartering, then and there, and the commodities change hands then and there, but the man who sells raw copper in market for money does the first half of his bartering with the man to whom he sells by taking his money, while the man to whom he sells accomplishes the last half of his bartering by getting copper in exchange for the money which he himself had received while doing by a sale his first half of barter; and the seller of the copper will accomplish his *last* half of barter when he buys something else with his money. The man who buys the copper indirectly barters something else, say iron, for the copper he buys, and the man who sells the copper indirectly barters the copper for another commodity he will afterwards buy with the money proceeds of the copper, say platinum.

Silver and gold, as commodities in the character of raw material, so to speak, *have no selling market;* they have only a *bartering* market, and that is their *first* market, which they may or may not go through before they are used as money. Their second commodity market is where they are sold as plate, foil, or sponge, jewelry, etc. Like copper, they have, *as commodities*, but two markets, and that is the raw material market and the market of manufactured goods, their third market being the conventional one in which they buy goods. To understand the *true* science of the subject this analysis must be clearly understood, and what it teaches rigidly maintained. The grand difference between copper on the one hand and gold and silver on the other hand is, that copper, as raw material, is sold, which is the first half of indirect barter; while gold and silver are *directly* bartered for each other, and for each other only, *if bartered at all;* and hence they cannot, in any *correct sense*, be said to be sold as raw material, because selling is *first* half of indirect barter, and buying the *last* half, while gold and silver change hands as commodities *directly* in barter, if they change hands at all, *because* there is *no other market* for them. Their value as raw commodities exchanged for each other becomes, therefore, in effect, but an abstract term, as far as commodity value, so called, goes. The grand question is one of arithmetical profit in money, by the bullion exchange, and that at last resolves itself into a question of *profit in commodities*, to be made *through* the money. To attempt to grasp a commodity profit out of the commodities gold and silver in bullion is an attempt to grasp a phantom or will-o'-the-wisp, the entity and quiddity of the schoolmen, or the commodity of the Mercantile Theory. Gold and silver are marketed as commodities only when they are bartered for each other, or manufactured into plate, jewelry, etc., and sold; but when they are paid out as money they are *used* as a commodity, and *not bartered or sold* as a commodity. They are bartered sometimes before going into circulation, and also when, if at all, they are taken back out of circulation to the first market and actually exchanged for each other, as when, through mono-metalism, they locally lose their character of money, and have, therefore, to be exchanged as bullion for each other directly, although it may be without actually going into a bullion shop: their third market, where they pay as money, is one of conventional or mathematical value only. The more copper goes out of its first market of raw material into manufactured commodities which are sold as such and go into use, the less copper there is in the raw-material market and the higher goes the price in that market, subject to the variation in demand in the sense before explained, but the more gold *or* silver, with almost mathematical exactness, goes out of the commodity, raw-material (bullion) market, into plate and money, distributed throughout the world to plate consumers and money holders, *so much the higher*, as bullion, rises the metal which thus goes out of bullion, *not with the variation of demand*, but with *almost mathematical* exactness, and, on the contrary, the less, with like exactness, gold *or* silver goes out of that market, the lower, with like exactness, does it fall in that market, because quantities in the bullion market are inverse to quantities in plate and money. If gold *or* silver rises in quantity or falls in quantity in this exact manner in the bullion or barter market, and therefore inversely falls or rises in value in this exact manner in the same market, it is because there is no question *or relation of intrinsic value* in the case, but mathematical, in other words, conventional, in still other words money, value only. Silver stands *conventionally* at 15½ and gold at 1 in the gold series of France, and silver at 16 and gold at 1 in that of the United States, mutually exchangeable for each other upon those terms, although the illusory theory that money is a commodity and not chief agent in a process holds that silver thus stands *conventionally*, *or*, *in other words*, *as a token*, to the extent of $\frac{16}{100}$ and $\frac{18}{100}$ only, in the two series respectively, while in India, China, and other mono-silver countries, silver is *not* thus conventionally exchangeable for gold, because free conventional coinage and use are given to silver *alone*, and gold is thus excluded from the series, while by means of limited coinage in France and the United States, it has hitherto been kept in the mono-gold series. Gold is therefore now the standard metallic unit to barter as commodity for gold, and make thereby, through the arithmetical money profit, a commodity or mercantile profit of 16 per cent. by buying goods in mono-silver countries with the silver for which the gold is thus bartered, and exporting the goods from mono-silver and importing them into mono-gold countries. *In this sense* there is a brisk demand for the goods of mono-silver countries to carry into mono-gold countries; but there has been hitherto no large amount of silver to send to mono-silver countries: the larger part of the silver has been distributed to mono-gold countries (France particularly), virtually to maintain their gold series by eking it out, so to speak, with silver units, using the gold only internationally. The surplus silver, after supplying these wants, must go, at last *slowly*, to mono-silver countries; but meantime the lower silver, or the higher gold, goes in bullion, so much *the greater are the profits of bartering gold for silver*, buying arithmetically with the silver in mono-silver countries, and importing the goods bought with the silver money into mono-gold countries. But because trade of all kinds where money is not used is, *as everybody knows*, direct barter, and where money is used indirect barter, although everybody mistakenly believes it to be direct barter also, *there is a limit to this kind of trade.* Money comes only from sales, and if money is borrowed, it must be repaid by means of sales, and in order to get gold money in mono-gold countries to barter for silver and buy with the silver in mono-silver countries, a merchant in mono-gold countries must confine so far *his indirect barter to his own country*, thus bartering his own goods for his fellow-merchant's goods, instead of making a healthy interchange of goods with mono-silver countries. A healthy reaction will restore healthy international trade from time to time between mono-gold and mono-silver countries, *in spite of mono-metalism*, but it will be done spasmodically, until the silver is all marketed away from the silver bullion market into a monetary prolongation of the silver series, say 8 per cent., and gold thrown back upon the gold market at the expense, by shortening, of the gold series to the amount of 8 per cent. Gold will then become standard of profit instead of silver, in the sense defined, and there will be, then, a 16 per cent. profit in confining indirect barter to mono-silver in place of mono-gold countries, bartering the silver obtained by merchants on sale of their goods in mono-silver countries for gold in bullion, instead of bartering gold for silver as now, and buying goods with the gold *as* money, in mono-gold countries. To stop barter half way carries up prices, and thus an excess of bank loans which give the right to make the last half of barter before the first half has been made by the buyer at all, raises prices; while to assign one's right of making the last half of barter, if one still continues to exercise the same right himself without limitation through, or by reason of, the assignment, raises prices; but if he assigns the right without exercising it himself, it will not raise prices. These assertions sound strangely, but they are mathematically true, and their truth can be perceived, when my science of money is understood: they are mathematically true, because money is an auxiliary only, and, as such, not a commodity or article of barter, but a process for the conversion of direct into indirect barter, and, therefore, maintenance of geometrical proportions, as well as intrinsic values, between commodities to be indirectly bartered must, and will, be maintained sooner or later. If the crop of wheat, the staff of life, fails partly in a country the quantity of wheat falls in its geometrical total as compared with the geometrical total of other commodities to be bartered indirectly for it, *through the medium of money*, and hence there is relatively a greater geometrical total of commodities to be bartered indirectly for the lesser geometrical total of wheat. It is, for the most part, actually a rise and fall of geometrical totals, which *causes* inversely a fall and rise of values. The *operative cause* is rise and fall of relative quantities, and the *result* is abstractly, in other words, arithmetically, expressed, in terms inverse to quantities; and the terms used are the units of an arithmetical series, with a name of designation, like dollar or pound, attached to the unit.

If there are no banks, and money holders have *a metallic series* for the most part, and especially if they are conservative and cautious like the people of France, irredeemable paper may be issued directly by the government, or indirectly through a bank like the Bank of France, and *the metallic series retired;* the people thus indirectly assigning or transferring, and in effect loaning, to the government their right to make the last half of indirect barter which their possession of the metallic money demonstrates that they possess by means of sales of commodities, which carried the retired money originally into their hands, thus waiting to make with other commodities *another first half* of barter for the paper money, *as it gradually comes into their possession*, through sales made by them, and then completing the resulting and complementary second act of barter *with the same paper money* they receive, until finally they retire the paper money by funding it in the national debt, and the metallic series takes its own place again. Exactly the opposite result occurred after the breaking out of the French Revolution through excess of issues, preceded by want of confidence, although moderate issues could have been sustained, and so in the American Revolution. The right of making their second half of barter was assigned by the English people to the English government after the breaking out of the French Revolution; but they continued to exercise it themselves independently of the assignment, through their previous paper and bank-credit money; and such was the case at the breaking out of the late civil war, in the United States. Banks everywhere, through the want of fixation of the metallic series in their reserves, cause a fluctuating *arithmetical difference* between loans and reserve, and thus assign by their loans to borrowers no right to make the second half of barter as the complement of the first half, but a right to make on credit the last half of barter by buying, where no one has ever performed the first half by selling. The result is that the credit right conferred in excess by the loans, of making the last half of barter where no one has previously made the first, enables borrowers and their employees to consume vast totals of commodities, and notably the absolute necessaries of life, for which, as producers, they have nothing to show but a geometrical total of commodities they have produced, like iron, copper, lumber, cloth, etc., which brings the latter geometrically in excess of the former. Meantime the prices of their geometrically-overproduced goods have been carried up rather than down, *in opposition to the law of geometrical proportions in general* before demonstrated, until *the paramount law of geometrical proportion* prevails as last, and a reaction in prices sets in *in defiance of arithmetical extension of the mone-*

tary series through loans. Again, to send even metallic money, as did France, in enormous amounts, to another country, like Germany, although it assigned the right of making the last half of barter, the first half of which had been made mostly in France, still, the last half was made *largely in Germany*, and thus conferred too much buying or bartering power in the indirect sense explained, and injuriously carried up prices, somewhat as in ancient Rome, when vast sums in gold and silver were carried there by military fines and tribute, thus adding locally to money without increasing commodities. Still again, injurious reaction may result *even from thrift and economy*, which are themselves the *result of reaction from excessive energy of production*, as in England and the United States. Large sums in gold have of late been expended by foreign nations in the purchase of absolute necessaries and raw material, exported from the United States. The first sellers of these goods in the United States made the first half of barter by selling the goods to buyers in the United States who bought *largely with borrowed money*, and so far the latter completed the last half of barter without ever having made the first half: these buyers shipped and sold the goods for gold which has been carried to the United States, paying bank loans to a large extent, and at the same time increasing bank reserve to some extent, and the remaining gold remitted by buyers abroad, who do not owe in the United States, has gone largely into bank reserve, and largely out of it; but whether it has, or has not, gone thither and thence, gold thus carried or brought to the United States *is the total price of the goods, which through thrift and economy have made the first half of international barter for gold;* and meantime the second half of international barter is postponed, as respects a part of that gold, to a future occasion; but meantime the gold is producing, *not as yet a rise of prices in commodities,* but an excessive rise in stock exchange values, not warranted even by the extraordinary increase of internal traffic. A reaction always follows in such cases, sooner or later, where money leaves one country in excess and goes to another; *not that the movement of money itself is important,* but as its movement is the result of forces behind it.

The Mercantile Theory or the Mercantile System, the follies of which were pointed out clearly by Adam Smith, a man whose sagacity was so great that he himself demonstrated, practically, the falsity of the theory that money is a commodity, is in reality the theory that money is a commodity or article of merchandise, and the resulting commercial restrictions established with a view to increase the imports of the commodities gold and silver by diminishing the import of other commodities were *only one practical* (not scientific) form of demonstration that gold and silver money are not commodities by a *reductio ad absurdum.* Smith himself says it would be too absurd seriously to argue the question whether all wealth consists in money, and yet, as I have already demonstrated, and paradoxical as it sounds, the holders of money have a right to that half of commodities which is being indirectly bartered, and so distributed through money, producers consuming *the other half without bartering it.* Call money and goods evenly divided on the average between money holders and holders of commodities, each having on the average half and half, each of the holders has half his circulating means in goods, and the other half in rights to goods. The goods are being bartered daily and hourly through the money: the barter is means to an end, and not an end in itself, and if the end could be accomplished without the means, *the means* would not be resorted to. When the goods are bartered they are being marketed into the hands of consumers, and the latter is their *last market*, while the same money may go the rounds of barter for generations. The money — gold, for instance — is consumed as a commodity more or less, and sooner or later, in bartering, undoubtedly: one phase of the grand fallacy lies in supposing that its circulation, which is in reality the *use* of a "very valuable" commodity by the whole corporate body of buyers and sellers throughout the world, in *making* their indirect barter of commodities *is itself a barter of gold* or silver. A commodity may go into use without being bartered at all, and gold goes largely into use as money without being previously bartered for silver, while silver goes largely into use as money without being previously bartered for gold. *The end of a* *commodity is use*, and if the end can take place without barter as a means, in addition to production the first means, it does so, and very largely in the case of metallic money. What the metallic money cost is not because it *cannot be* the question: it cannot be the question as long as the metallic money has no price, and it is mathematically certain that it never had price, if it was never bartered; and if it were ever bartered it was bartered only for gold or silver, being one or the other itself. If mono-metalism caused no monetary spoliation, it would still be a bad system in point of science; but it would answer all the purposes of international trade: it would answer the purposes of trade now if there could be any assurance that the 15½ pounds of silver in rupees, sycee money, dollars, etc., will continue to buy as large a geometrical total of commodities in mono-silver countries as 1 pound of gold will continue to buy in the shape of gold dollars, pounds, etc., in mono-gold countries. This is actually the case to-day, if silver money does not go to market as bullion in mono-gold countries, and gold money to market as bullion in mono-silver countries. The only end and aim of bi-metalism in monetary science as a *practically applied* mathematical science, is to avoid the marketing of gold in silver before it can be used as money, and of silver in gold before it can be used as money. The object, I repeat, is to keep out of market entirely, and use both metallic commodities as money, without going to market with either of them at all. The only cost of coining in labor is geometrical apportionment of weight to the units, geometrical construction, and thus government certification of the commodity gold and the commodity silver by *means of geometrically-constructed* units of weight (and that cost is comparatively slight), in order to place the unit in its series, and the two series ought to form 1 joint series of units, geometrically proportioned by weight, shape, and size, and mutually interchangeable at the geometrical proportion of 15½ and 1, until and unless a *joint* reason arises for changing that geometrical proportion. Thus placed, and thus interchangeable in these geometrical, or, in other words, mathematical proportions, there would be no longer a necessity for carrying either to market, *any more than paper units in an arithmetical money series*, which, when inconvertible, would not be carried to that market, because they are simply units, and not commodities. If any assurance could be given that the productive forces will *expand* 8 per cent. gradually in mono-silver countries, so as to compensate for the extra 8 per cent. silver in the series they must gradually take into their silver series and that the productive forces will *contract* gradually 8 per cent. in mono-gold countries, so as gradually to *contract* the geometrical dividend of the gold unit in commodities 8 per cent., while gold is falling 8 per cent. in bullion back to 1 : 15½, and silver rising 8 per cent. in bullion back to 15½ : 1; or, in other words, while gold is falling 8, and silver rising 8 back to the geometrical ratio, prices would be steady; but there is no assurance of these results from monometalism. On the contrary, the presumption is against them, even admitting them to be desirable. The only certain thing mathematically is, that gold and silver will go back to 1 : 15½ in quantity in all the bullion markets of the world. When silver is marketed in gold, and carried into circulation in an excess of 8 per cent. in mono-silver countries, it will be so far out of the bullion market, and will become "scarce" there by falling off there geometrically 8 per cent. in quantity, and the opposite will be true of gold, which will cause a rise of 16 per cent. against gold, in favor of silver. We may call it a rise of silver arithmetically, through its fall geometrically in the bullion market, or a rise geometrically in commodities of 8 per cent. on the part of the gold unit, added to a fall geometrically in commodities on the part of the silver unit. If direct barter were in use, and the barterers carried about with them no tangible units like shells, paper units, ivory, or metallic counters to aid them in forming an arithmetical series for bartering, making use only of mental units or units of memory, the members of one community which mentally employed twice the number of units employed by another community with which they bartered, could do their bartering nevertheless without difficulty. If the community having twice the number of mental units in use by the other called one commodity 6 and another 8, while the community having only half that number in use called them 3 and 4, the former community, in bartering with the latter, would find the unit of their series worth arithmetically twice that of the other in arithmetical proportion, but worth only half that unit in geometrical proportion. The unit of the first series would stand arithmetically to that of the second series as 2 : 1; but the geometrical value of the unit of the first series in commodities would be inversely as 1 : 2. There would be no difficulty, however, because the commodities of the first series would be bartered arithmetically direct, and geometrically inverse, for those of the other, and *vice versa*, precisely as if the barterers had each converted their mental series respectively into paper units, abolished direct barter, and converted it into indirect barter by selling the commodities of the long series for commodities of the short series, and thus making the first half of barter; and then buying commodities of the short series, taking them back, and making the last half of their barter in the long series. *Precisely the same would it be now if there were no money but paper money in the world.* If a short inconvertible paper series were in use in India, and a long one in England, or *vice versa*, commodities could be bartered out of the one into the other without loss: exchange would run arithmetically in favor of, and geometrically against the unit of the long series, and arithmetically against, and geometrically in favor of, the unit of the short series. On the contrary, as the case actually stands, while the unit of the Indian silver series *stands arithmetically and geometrically on a par with the English gold series*, and the latter with the former in respect to the length and the commodities of each series, save, possibly, the fluctuations through reaction, before abundantly explained, the geometrical or dividend value of the silver unit in the commodities of its series is utterly annihilated in mono-gold countries, and the unit itself marketed as a commodity at a loss of 16 per cent., while, on the contrary, the geometrical value of the gold unit in commodities of its series is utterly annihilated in mono-silver countries, and the gold unit is bartered as a commodity for silver, with a resulting *temporary* money gain of 16 per cent. The geometrical value of the silver unit in *all the commodities* of its series is converted into a geometrical value of the bullion of its unit in *one commodity* gold, at a resulting geometrical loss in commodities of mono-gold countries of 16 per cent., while, on the contrary, the geometrical value of the gold unit in *all the commodities* of its series is converted into a geometrical value of the bullion of its unit in *one commodity* silver, at a resulting geometrical gain in the commodities of the silver series of 16 per cent. When gold rises, and silver falls, geometrically (in quantity) in bullion, each 8 per cent.; when the gold unit rises geometrically in commodities of its series 8 per cent., and the silver unit falls geometrically in the commodities of its series 8 per cent., then the opposite will be the case, as before explained. Merchants will then make a profit, not as now by buying Indian goods with silver, selling them in London and Liverpool for gold, turning round and bartering that gold for silver to buy again in India in order to sell again in London and Liverpool; but by selling Indian goods first of all in India for silver, then bartering the silver for gold, and buying with the gold in London and Liverpool, to carry the goods to India and sell for silver, with a profit in silver of 16 per cent. *in the nature of a bounty founded upon no actual consideration, save the phantom of barter value in money*, as they now get a bounty of 16 per cent. in silver by bartering gold for silver, and thence in goods bought with that silver in India. Stated geometrically, in rigorously exact terms, the present 16 per cent. geometrical increase of silver in the bullion market in excess of gold is the source of *a bounty* (geometrical) *in Indian* goods of 16 per cent. to any and every merchant who *can* barter gold for silver, and buy goods with the silver in mono-silver countries at average prices. If the goods thus bought with the silver could always find a *sure and speedy market in gold* at not 16 per cent., but less than 8, or even 4 per cent., it would furnish a very active trade; but the profit in gold must come through a sale of the goods for gold to consumers, and before such a sale can take place the consumers must have mono-gold goods to give in exchange for mono-silver goods, in the usual geometrical proportions. But mono-gold goods are already geometrically in harmony in point of quantities, and therefore in exchanges with mono-silver goods, and it is the *arithmetical exchanges alone* which are at fault through mono-metalism. The geometrical harmony of the mercantile exchanges is demonstrated by the fact that trade has not diminished, and the mercantile exchanges only are therefore disturbed by the arithmetical discord of the monetary exchanges, because the latter are only means towards ends. The means are arithmetical, but the ends are geometrical, and the latter control the former now in all cases, save where the arithmetical metallic unit of purchasing power is bartered as a commodity, and its proceeds in money laid out in goods, instead of being used as money itself. The 16 per cent. profit made now by bartering gold for silver, and using the latter as money in mono-silver countries, is limited: first, by the geometrical limit to goods in mono-gold countries; second, by the geometrical limit to goods in mono-silver countries; third, by the law of geometrical proportions in the exchanges of commodities. The arithmetical units of gold and silver in which the geometrical proportions of the goods are stated, and through which they are indirectly bartered, carry valuable commodities with them since they are, over and above the fact of being mere arithmetical units like those marked on bank notes or entered on bank books, geometrically weighed and constructed, units of the valuable metals gold and silver, which are commodities themselves.

The commodity or barter theory of money, cor rectly stated, is that the value of the metallic unit in exchange for goods is limited by, and rises and falls with, the commodity value of its metal as bullion. Therefore, silver either buys 16 per cent. less in mono-gold and mono-silver countries than when it stood at 15½, or else gold buys 16 per cent. more, or both.

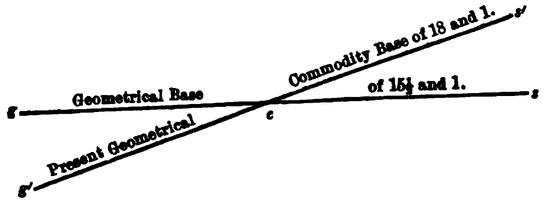
CHAPTER III.

THE METAPHYSICAL OR INTELLECTUAL BASE OF THE MATHEMATICAL DEVELOPMENT OF MONEY.

THE metaphysical base of the mathematical development of money lies, first, in the necessity of substituting indirect barter for direct barter. This can be effected only through an *intermediary* or third term *between* the things to be thus indirectly bartered. If the third term is metaphysically, as well as physically, of the *same kind* with the two other terms, one of which is on either side of it, then the three terms being each geometrical quantities *of the same kind*, the only change effected is that the intervening term *must* be bartered *twice* in order to effect an indirect exchange of the terms on either side of it. One of the outside terms must first be exchanged for the intervening term, and then the latter for the other outside term. The three terms being thus geometrical quantities of the same kind, and the middle or third term being geometrically (*not arithmetically*) bartered twice in order to effect the indirect exchange of the two outside geometricals, the middle term may, *in this* *sense*, be said to be geometrically double-bartered. But the third term differs metaphysically from the other two; for, take now 4 geometrical, "intrinsic-value" terms: 1 ton of copper, 10 tons of iron, 8 tons of lead, and 60 ounces of platinum, with 20 double eagles of gold between the copper and iron, 20 double eagles of gold between the iron and lead, and the same number between the lead and platinum. Buyers and sellers relate these geometrical intrinsic-value quantities as equivalents in exchange, *through* the money, each parcel of which contains a geometrical quantity, say, 20 ounces of gold, *in point of fact.* Now the copper, iron, lead, and platinum are, what I will call, *live* geometrical *weight* wanted by consumers, and *they know* the amount of each of them, when buying and selling; but they *do not know the weight of the gold pieces*, and the 20 ounces of gold are, *therefore*, as to them metaphysically, *dead geometrical weight*, and thus the *gold is only an arithmetical medium* in which the copper, iron, lead, and platinum are related in *mathematical + intrinsic-value proportion* by buyers and sellers, *notwithstanding* the fact that the gold has also in itself potentially "intrinsic value" as well as geometrical quantity. But each of the geometricals, copper, iron, lead, and platinum, *is worth 20 ounces of gold* in exchange, and the Ptolemaic illusion is, that the gold is *live geometrical weight* in the exchanges *for consumers*, as well as the other metals, and hence demanded and supplied *like them*, although its weight is unknown to buyers and sellers. The gold being, in *point of fact*, geometrical quantity, with potential "intrinsic value," has an *apparent* movement of *value like* that of the other metals, whereas the *only actual movement of value for consumers* is in the other metals. The *fact* that the other metals are, each of them, exchanged for 20 ounces of gold, *produces the Ptolemaic illusion* that *gold has the same movement*, whereas the *dead weight is unknown*, and the metal has only the *value of 400 units called Dollars*. Until this illusion is *known to be* an illusion, and until it is perceived that the *real movement* is not in the gold, we are in the Ptolemaic stage of monetary science, and there *we shall continue* to be until we can recognize (have intellectual cognition) that the gold *as money* is the *carrier* of commodity value through *human agency*, and not the possessor *in this exchange* of commodity value, the human intellect being the *creator* of value, and *actually* waiving the commodity value of the metal gold for *individual consumers'* use, substituting for it, *by necessity*, a conventional or mathematical value, the dead weight of the metal thus performing the *invaluable service* of furnishing a series of valuing arithmetical units interposed *between the geometrical quantities wanted by consumers*, and *limited at a fixed point* by the *coefficiency of the dead weight of metal* of the series. The fact that gold is a potentially valuble geometrical quantity exchanged for geometrical quantities, produces the *illusion* that there is a *real value movement* in the gold controlled by the forces of demand and supply, whereas there *is no real value movement* in the gold *by weight*, save in the sense of arithmetical, or abstract mathematical, value relating and exchanging geometrical quantities any more than there is a real motion in the sun around the earth, consumers' value being intellectually, although unconsciously, waived for purposes of much greater importance. When the Ptolemaic stage passes into the Copernican the continuity of the bi-metallic series will be renewed and *extended*, and paper money and "credits" *limited by the coefficiency of metallic money.* The natural development of trade and money, mathematically stated, is a geometrical series of quantities wanted by consumers, with an arithmetical series (money) interposed between every two geometrical quantities exchanged. Weight and cubical and lineal measure of themselves furnish *enough* "standard" for commodities wanted by individual consumers, but *not enough* standard for the units of the interposed arithmetical series. These units require *not only weight*, but a *rigorously exact* geometrical apportionment of weight to each abstract unit, which buyers and sellers call in the *natural mathematical language* they employ 1 dollar, 1 pound, 1 franc, etc. The arithmetical series of dollars, pounds, and francs is *naturally and mathematically developed* to meet the intellectual want of a bartering unit in the arithmetical proportions of *indirect geometrical barter.* But in order to have that kind of barter in place of *direct* geometrical barter, there must *first* be an equation between the units of each series. A geometrical must be first exchanged for an arithmetical, and then that arithmetical for another geometrical, and this *indirectly* barters the two geometricals. The numerous proportions, both aritnmetical and geometrical, may by supposition be summed up on *each* side, and this gives a grand equation of arithmeticals on one side and geometricals on the other, the arithmeticals being as one whole naturally and necessarily at the same time a divisor, while the geometricals are, as one whole, naturally and necessarily a dividend. The material physical standard of weight and measure, as an end in itself, is applicable only to commodities wanted by individual consumers of geometrical quantities, and not to gold and silver money which, although having rigorously exact weight, has it for a purpose diametrically opposite to the purpose of weight in commodities. The money unit has particular weight in order to form a *definitely limited arithmetical monetary series*, to be used in exchanging the geometricals of consumers: weight is the *end* sought in geometricals, but is only *means* to an end in arithmeticals. The *real standard*, then, in the units of the arithmetical series, as distinguished from the *real standard* of the units of the geometrical series, is not a *tangible thing*, but the nearest approach possible to the fixation of the fluctuating arithmetical series as exactly as possible, and maintenance of the proportion between arithmeticals and geometricals with the least variation. Hence, in the bullion market we have from one angle of observation two geometricals, gold and silver, and their only market is each other, and each is always worth the other, while from another angle one is sometimes worth more than the other as money, because its mass will, at the geometrical ratio, furnish the most money. They are *directly* bartered for each other, and one *must necessarily, as a geometrical*, always be worth the other in that market. But only a *small* part of either is in market at any time, and if one happens to be relatively in excess, *it is as money to buy with*, arithmetically worth more than the other, *precisely* to the extent of that excess, and hence the *arithmetical profit in money* arising from *getting at and availing* one's self of that excess as far as possible. Hence the necessity of the longest monetary series possible, and that is a bi-metallic one. Hence, also, the necessity of limiting paper money and "credit" money *definitely* by metallic money. Hence, also, the *logical soundness* of the opinion of those called mono-metallists, *just as long* as the *arithmetical* monetary series is *assumed* by bi-metallists and mono-metallists to *be a part, and a continuation, of* the geometrical series of individual consumers, and not an interposed arithmetical series.

This mathematical, or, in other words, what I will call the mathematico-metaphysical theory of money, which I claim to have demonstrated, and which may well be called my theory of money, stated in general terms, is, that the value of the unit of money, whether paper or metal, is altogether and exclusively conventional value, founded on arithmetical proportion metaphysically conceived and mathematically applied, to indicate the geometrical proportions in which commodities intrinsically valuable ought to be, and actually are, exchanged by quantities, and that the mathematical abstract unit thus metaphysically conceived and practically applied, has been localized in a commodity or tangible thing, which can be carried away, and *used as a token unit*, having, as such, over and above its original, and in addition to its mathematical, value a token value, by means of which two values it is enabled to bring to its owner commodities, in certain proportions. What are those proportions? Those (geometrical) proportions are determined by the law of arithmetical proportion, practically applied to express the geometrical proportions. Metaphysically, or, in other words, abstractly, there is no definite limit to the number of abstract units which we designate arithmetically as I, and, therefore, when the unit was first localized and carried about as money it became at once necessary *to limit the number* by using some scarce material or article which required labor to put it in shape, but as society advanced to a more complex condition the first simple devices became insufficient by reason of the tokens becoming too plentiful, like the money of the American and French revolutions, losing geometrical value by arithmetical extension, or, possibly, in some cases, too scarce, and thus gaining too much geometrical value in exchange by arithmetical diminution. This *led to the introduction of the precious metals*, which are *valuable commodities*, and are, of all other things, best suited to furnish and maintain the needed conditions of localization of the abstract metaphysical unit, and the fixation and permanent limitation of its arithmetical series, as *means to an end*, that end being fixation and permanent maintenance of geometrical value *through* fixation and permanent limitation of arithmetical value. This mathematical and metaphysical argument was not made *probably* by those who introduced money, but they *made the argument for all practical purposes*, nevertheless. The value of the metaphysical or abstract mathematical unit I can by no possibility be a pound, an ounce, or a pennyweight of metal, because it is *pure*, *abstract*, *mathematical value*, stated in terms of an arithmetical proportion in prices, and in terms of so many units *actually in* the equations of exchange for goods. The *result* is that the introduction of money has *really* given us (mankind), *without our knowing it mathematically*, a system of exchange which has converted direct savage barter into civilized indirect barter. The *mathematical elements* of the millions of minor problems of productive and consumptive, monetary and mercantile, or commodity exchanges which are all the time being worked out practically throughout the world by millions of producers and consumers, buyers and sellers, working to a common intent and purpose as members of one corporation of indirect bar terers, without being aware of it, are: first of all, the proportion expressed in monetary units (*not borrowed*) between the commodities a man sells and those he buys, and the resulting equations between money and goods; and the sum of the units is the sum total of the money received added to the money paid. The money received for commodities stands in proportion, arithmetically, to the money paid afterwards for commodities, and *e converso*, and the total money is the total series of arithmetical units employed to express the proportions, while the money received forms an equation with goods sold, and money paid an equation with goods bought. The second element is the proportion expressed in monetary units (*borrowed*) between the commodities a man buys *with* money and those he produces and sells *for* money, the proportions and equations being thus reversed, because the sum of the subseries is the sum of money paid added to that received, instead of money received added to money paid. The third element is labor, with tangible (geometrical) productive results in commodities, which labor is *sold for money*, not only before the commodities the labor produces are sold, but *before they are produced.* The first member of this proportion, arithmetically, is money, and the second member does not geometrically exist to make the proportion until the goods are not only produced, but *actually sold for cash not borrowed, because to sell for borrowed cash is to leave indirect barter only half completed.* Indirect barter begins here by selling labor for money *borrowed* by a producer, and the indirect barter cannot be completed until the goods produced by the labor are indirectly bartered for the goods the producers and laborers have *bought and consumed with the borrowed money.* The producer has *bought* labor which the laborers have *sold* him, and he and they have also bought merchandise with the borrowed money. By selling the goods produced for cash, not borrowed, and *thus only*, they will have been indirectly bartered for the goods consumed. The *blockade of the mercantile exchanges*, with these unsold products of labor, unsold for cash, not borrowed, because they are *geometrically in excess of other commodities which could not keep up with them*, is the cause of banking, commercial, and industrial crises for the most part, and the chief origin of the "wrongs" of labor, the lottery of capital, and the social disturbances in the United States.

The fourth element is labor of mind or hands, or both, sold for money, but leaving no *tangible* result in commodities to be sold, but values, which are themselves invaluable, and are paid for *nominally* in money, but really in commodities: such services are indirectly bartered for the commodities received and consumed. These are the mathematical elements of the grand problem taken as a whole, and, naturally developed in mathematical form, from a metaphysical base. The total result is a series of arithmetical and geometrical proportions, the sum of the units in any arithmetical proportion constituting a series, which may be called a sub-series, while the commodities exchanged stand geometrically proportioned, not perfectly, but as modified by intrinsic qualities, and subject to *fluctuations through demand and supply.* The *tangible units*, by which geometrical proportions are indirectly stated, through the two equations, goods in seller's hands = money, and goods in same seller's hands turned buyer = other goods bought with the money; and the same equations reversed, where the buyer buys goods before he sells, because he buys with cash borrowed, and afterwards sells goods to pay his debt, all taken together, may, by supposition, be summed up and added to form one grand proportion between moneys received and moneys paid, and goods sold and bought, while the equations themselves, summed up, form one grand equation of total goods bought = total money paid. The paper unit *has the same token value* with the metallic when it is convertible, and even sometimes when it is inconvertible, because, and *only because*, it buys the same amount of goods. If inconvertible, its purchasing power or geometrical value in commodities, where it is in use, may be so great that no profit could be made by sending the metallic unit abroad and buying goods. The monetary unit being for the human intellect *at all times, and under all circumstances*, the unit of an arithmetical series, in consequence of geometrical weight being *necessarily*, and *therefore* mentally, waived, when the units of the series are used by buyers and sellers in stating in arithmetical proportions the quantities of commodities indirectly bartered, the monetary paper unit *has* arithmetical, in other words, *mathematical value only*, there being *in it* no commodity value to waive, which mathematical value is founded in all kinds of money on the metaphysical conception of the intrinsic qualities of the geometrical quantities the money will buy. Monetary value is, therefore, in all cases, whether the money carries a valuable commodity or not, abstract value, or value in the metaphysical abstract, as opposed or inverse to value in the physical concrete. If there be any physical or geometrical fact of which there can be no doubt, it is, that either silver has risen geometrically in bullion 16 per cent., gold being geometrically stationary, or that gold has fallen geometrically in bullion, silver being geometrically stationary; or, once more, that silver has risen geometrically 8 per cent., and gold fallen geometrically 8 per cent. Suppose, what is *really the fact*, that silver has risen geometrically in bullion exchange 16 per cent., this geometrical rise may be illustrated by a horizontal line and a line of half the length, making an angle with that line of 16 degrees. Thus: —



Point at which silver is now geometrically long 16, and has most purchasing power by 16.

Point at which gold is now geometrically short 16, and therefore has less purchasing power by 16.

Silver has risen here by the line *c s' geometrically above* gold in quantity 16 per cent. relatively to the old base line marked 15½ and 1, *c* being the centre of that base line. Had silver been geometrically stationary, while gold fell geometrically 16 per cent., the movement would have been represented inversely in the same manner by the line *c g'*, because it is a question, not of how much gold and how much silver there is in the bullion markets of the world, but how much the gold in all the bullion markets is geometrically in excess or defect of silver, taking 15½ and 1 as the geometrical (not standard) base line, or, *per contra*, how much the silver in all the markets is geometrically in excess or defect of gold, taking 15½ and 1 as the geometrical base line. Had silver risen and gold fallen geometrically, each 8 per cent., then *s* would have risen only half way toward *s'*, while *g* would have fallen half way toward *g'*; but the change of proportions between the masses would still be 16 per cent. Silver and gold are, by necessity, geometrical equivalents in exchange so far as respects the quantities actually in the bullion markets, but if gold in the bullion markets is geometrically in excess of silver, that portion in the bullion market has so much more purchasing power arithmetically than silver, as the silver actually there now has arithmetically 16 per cent. more than gold. But silver, although it has risen geometrically in bullion 16 per cent., whereby *that part in bullion* has 16 per cent. more purchasing power than the gold there, has actually fallen "*in value*" 16 per cent. Value of commodities, as metaphysically conceived, is always expressed by geometrical quantity inverted, but because arithmetical and geometrical values are inverse, gold and silver, unlike other commodities, *rise and fall arithmetically* in bullion, precisely to the same extent that they *fall and rise geometrically* in bullion. If wheat falls geometrically, it *rises in value*, and the meaning of the expression that it rises in value, is, not only that it will take more, geometrically or in point of quantity, *of other commodities*, to buy, *through* money, a bushel or any other measure of wheat, but, *that the comforts and conveniences of consumers in general will be reduced in proportion.* If wheat rises in quantity, unlike gold and silver, it falls arithmetically, and this is a gain to all consumers, who have other geometrical quantities to give for it, because it calls upon them for so much the less of those quantities through money; but if silver is geometrically 16 per cent. in excess of gold in bullion, it means that the only market of silver being gold, there is 16 per cent. more silver in the market than gold, counting, not from an *attempted fixation* of a commodity ratio of production, but from the geometrical base line of 15½ and 1, which only fixes the quantity of gold and silver the abstract units of money shall take. But, by the law of markets, although there is 16 per cent. more silver than gold, still *one can be had for the other.* This gives 16 per cent. *extra silver money*, which, although it can be had for nothing, can be used in silver countries alone, nevertheless. But the profit can be grasped only by buying goods with the silver in silver countries, shipping the goods to gold countries, and selling them for gold. To buy *so many more goods* in silver countries raises prices, and, on the contrary, to sell so many more mono-silver goods in gold countries makes those goods fall there in price. The movement is thus limited by the selling power of silver countries, and the buying power of gold countries. Goods of silver countries can be sold at some actual loss, and the loss *much more than recouped* by the 16 per cent. bounty paid by debtors for bills, payable in gold under the illusion of mono-metalism, which is only one phase of the illusion that money is a commodity, and as such has a commodity standard. The value of commodities in general is *altogether a metaphysical or abstract conception*, and means something more than the mere fact that a commodity, like gold or silver, has fallen off in quantity, and that there is, therefore, less of that *one* (gold) quantity to exchange for one other (silver) quantity, which is the one *only* value of that quantity; rise in quantity being the complement of fall in value, and fall in quantity of rise in value. When a commodity other than gold or silver rises in quantity, it rises in quantity in reference to all other commodities, while it falls in value *in all other commodities* which have not changed quantity. Silver in market, on the contrary, has risen in quantity *only* in reference to gold in market, 16 per cent., and has therefore fallen in value in reference to gold *only* in market, 16 per cent., but it has neither fallen nor risen in other commodities. But having fallen in gold it ought, by analogy, *it would seem*, to fall in other commodities. If this is not the *real* fact, it is at least the *apparent* fact, and those who deny it must show why it is not the fact, or, in other words, why the law which governs rise and fall of commodities in general does not apply in full to silver and gold; and if it does not, then why not. The real, the metaphysical, and the mathematical fact which excludes the law is, that the units of a series of a proportion, and of an equation, *have no necessary* limits, and therefore the mathematical or abstract unit *controls and carries the value of its bullion*, instead of the bullion controlling and carrying the mathematical value of the unit, and the law which governs the value of commodities is, in the case of gold and silver, *entirely subverted, inverted, and turned upside down*, so to speak.

Under general bi-metalism, the geometrical proportions of the monetary units of gold and silver, and their commodity proportions, *harmonize*, *because* nothing can be made out of the bullion exchange, except occasionally a small money profit by bartering one metal for the other, — all the metal in the market being money as well as commodity, — and the fact that such a profit can be and is made, without trade losses to counterbalance it, carries the excess of "cheap" bullion out of the market *at once*, as before explained, but under mono-metalism so called, as it now prevails, since the destruction of the bi-metallic chain, the inverted law has full and uncontrolled operation. Instead of a rise geometrically (in point of quantity) in the bullion market, which is a fall in value there, *being proof that silver has risen geometrically and therefore fallen in value in like degree in commodities*, the actual proof is that its arithmetical unit has risen mathematically in value in the proportions and equations of indirect barter (not necessarily 16 per cent., however, by any means), because the tendency hitherto has been to take gold out of the market, and not only keep silver in, but to carry it there and keep it there. As long as an arithmetical profit of 16 per cent. in money can be made, and thereby a geometrical profit of 16 per cent. in goods, subject of course, nevertheless, to the contingencies of trade, by bartering gold for silver, or, what is substantially the same thing, while it at the same time saves moving metal, by *docking* *arithmetically the silver series*, or adding arithmetically to the gold series, it will be made. But when, and as fast as, silver goes out of market into money, it *elongates arithmetically the silver series*, and so diminishes geometrically the quantity of commodities its unit buys, while precisely the opposite is taking place with the gold unit. The value of the arithmetical unit of money, being mathematical, the law which governs commodity values in general is, I repeat, entirely reversed in gold and silver. If copper falls in raw bullion or quantity, *it falls in all commodities*, and its manufactured commodity falls also, but if gold or silver falls in raw bullion or quantity, under universal monometalism, its metallic unit as money *rises in mathematical value in proportion, more or less*, and, in time, makes its geometrical value in commodities *inverse to its own geometrical value in bullion ;* not because there is any *necessary* relation between that bullion (used as money) and the same amount and kind of bullion in the market, but because the metallic unit, whether gold or silver, carries its dead geometrical weight of bullion with it, and *there is no limit to the quantity of money, which can be distributed and paid out, save the money itself*, or the necessity of abandoning it altogether, because it is impossible to do indirect bartering with it, as in the case of the paper money of the American and French revolutions. The "markets" *will take* all the silver they can get on the one hand, and all the gold on the other, for there is no necessary limit to the series, out of which the units are paid, and proportions and equations made. But when the units of silver have become plenty by 8 per cent. in the silver proportions and equations, and scarce by 8 per cent. in the gold proportions and equations, the silver the silver units carry into the silver series will be plenty there by 8 per cent., and the gold the gold units carry scarce by 8 per cent., while, inversely, silver will be scarce in bullion by 8 per cent., and gold plenty in bullion by 8 per cent., *in direct opposition to the law of commodities in general.* To prevent more or less monetary, and through monetary, geometrical, spoliation, general bi-metalism is essential, and the silver need not be handled at all, unless actually wanted to ship abroad, or supply the needs of ordinary retail trade. The metal of the metallic unit, in exchange for commodities, *must* always keep the value of its metal, through the overruling mathematical value of its arithmetical monetary unit, inverse to the value of the same amount of metal in bullion: each of the silver units thus increased arithmetically 8 per cent. will buy 8 per cent. less in commodities, while the bullion of the same unit will barter for 8 per cent. more gold than now, and the bullion of each of the gold units arithmetically diminished 8 per cent. will buy 8 per cent. more commodities, while the bullion of the same unit will barter for 8 per cent. less silver. Bills of exchange are orders drawn in the country of one series, payable in the country of another series, and paid for *out of the se-*

ries of the country in which they are drawn. As money has no value outside of commodities, except a commodity value of *its own* in bullion, to make gold or silver uncurrent in any country is to destroy its arithmetical value as money in commodities of that country at large, and substitute for it its own market value as a commodity. A bill or draft *out of* one series into another *ought not to be incumbered* with a commodity value of this kind. The *real, true, fair,* and *just* question for buyers and sellers of bills ought to be, What is the buying power in its own country of the unit where the bill or order is drawn, which unit pays for the bill or order; and, What is the buying power in its own country of the unit in which the bill or order is payable? This is, in point of science, the *joint* geometrical and arithmetical problem to be solved, and not, What is the *commodity* value of the metal which the unit of the series where the bill or order is drawn, carries? Little, if any, monetary, and through monetary, commodity, spoliation results from solving the first problem, but, more or less, always from solving the last, while vastly greater follows the lottery of banking and paper money. Under general bimetalism, and paper and bank-credit money in even ratio to metallic money, the metallic unit would always express mathematically the true metaphysical conception of value. If wheat fell in quantity 16 per cent., and rose in value 16 per cent., the expression of rise in value would be 16 per cent. more units of gold or silver than before for the same quantity of wheat, and *therefore* 16 per cent. less units for the *remaining* quantities of other goods. The 16 per cent. increase of units for wheat would in general terms express perfectly the idea and the fact of rise of value in wheat, while the increase of 16 per cent. in gold or silver units given for the wheat, not *as the cause* but *as the result* of rise in wheat, would also express the metaphysical idea of rise of value in wheat by an arithmetical rise in the pieces of gold or silver given for it, less wheat calling inversely for more pieces of gold or silver, while the fall in value and geometrical rise in quantities of all other commodities would be expressed arithmetically, in general terms, by less units and less gold or silver pieces given inversely for other commodities. The gold or silver, *having no commodity value in the equations*, but following their units in the expression, at one and the same time, of the metaphysical idea of rise and fall by arithmetical rise and fall of units in point of number, and *resulting* geometrical rise and fall, at one and the same time, in point of quantity, of gold or silver carried into the equations by the units, would express thereby, not a commodity rise or fall of their metal, but the metaphysical fact that wheat had risen, and that other commodities had fallen, and the results which in general follow. The same ideas are *always and everywhere expressed by money* more or less perfectly; but they would be much more perfectly expressed through a bi-metallic series all over the world, limiting all other kinds of money by its own.

Some further explanation of the nature of exchange in the light of my theory of money is perhaps called for. The elements of money, aside from the commodities it indirectly barters and distributes, are an arithmetical series composed mostly of metallic units, geometrically related by weight, and for the most part geometrically constructed in flat cylinders, *weight and geometrical construction being in harmony.* If there were no commodities to be indirectly bartered and distributed, the whole metallic series and its arithmetical proportions and arithmetical equations *would be abstractions*, just as long as the monetary series continued by supposition to be a monetary series only. Its geometrical value in commodities *depends upon the existence of commodities*, and thus exists alone through them. But geometrical proportions of commodities exchanged are constantly changing, not only of themselves, but through changes of the arithmetical proportions of money occurring unavoidably to some extent under any and all circumstances, and to such an enormous degree as to cause unknown, not even imagined, and *therefore* innocent, spoliation through paper money and banking. Here lie the real sources of the "wrongs of labor" and the "robbery of capital." Free trade and *protected trade*, free producers for all the world, and *protected producers for parts of the world*, have *their standing quarrel*, *the real grounds of which they do not, for want of analysis, understand themselves.* If a tariff gives a bounty to a home producer of 100 cents on a yard of cloth, or 100 pounds of metal, and a foreign producer can pay duty and sell for a bounty of 95 cents, he takes the market until his bounty rises to 100 cents and upwards, or above the par of the home producer, and the latter then takes the market for a time. *It is supposed*, in the absence of a true theory of money, and consequent absence of a true theory of production and commerce, that the only bounty paid is paid to the home producer; *but this is a great error.* The quantity of wheat may vary in 5 years, as compared with population on the average, less than 10 per cent., while iron and cloth have varied, the former 25, 30, 40, and possibly 50 per cent., and the latter 20 or 25 per cent. The cause — *the artificial cause* — of the disturbance is an arithmetical variation in *money paid*, and the immediate result is a *geometrical variation in the proportions of quantities produced.* But because this variation cannot be permanently maintained, a reaction sets in and restores equilibrium of geometrical exchange through a crisis. While prices are rising, arithmetically inverse to values of geometrical quantities of commodities produced, a British producer of iron can get, say, 40 bushels (5 quarters) of wheat for 1 ton of iron, but only, say, 25 bushels when they are falling, inasmuch as they do not stop at the neutral point of average arithmetical proportion which indicates average geometrical proportion of these and other commodities, because the inversion of geometrical proportions of quantities of commodities produced, notably such commodities as wheat, iron in general, and cloth in general, through arithmetical rise of prices, now reacts and carries down the prices of iron and cloth *in harmony with the actual geometrical proportions of wheat, iron, and cloth*, as they were unnaturally varied by the buying power of arithmetical extension through loans. The iron, while it is being geometrically expanded in quantity through the energy of production exerted in a constantly increasing ratio by means of loans, relatively to such commodities as wheat, raises prices of iron arithmetically in proportion to that expansion for a time, and until a reaction sets in, when, were it not for the loans, or, rather, had the geometrical excess been brought about without the loans (an impossibility, in fact), the iron would really, instead of rising for a time, as it did, have fallen, *immediately*, in accordance with the law, already demonstrated, that geometrical increase is arithmetical fall, always and everywhere, under the normal coefficiency of gold and silver in maintaining the arithmetical monetary series at its actual metallic length, generally and locally. When, through *this loss of the normal coefficiency of gold and silver* in arithmetically limiting money paid, in consequence of letting bank loans regulate banking reserve, rather than banking reserve regulate loans, the price of iron and cloth *goes up for a time*, although, by the law stated, it ought to go down, a British producer of iron, *under cover of this perverted rise of iron, can take a bounty of 95 cents*, because the American producer demands one of

100 cents. The bounty is ***demanded and paid, not through a tariff,*** but in spite of all tariffs, ***because it overrules all tariffs.***

To understand tariffs, taxes, free trade, and protected trade, it is necessary, ***first of all,*** to understand money, and ***then*** production and trade under the light of a ***true theory of money.*** Until that time comes, to dispute about bi-metalism, tariffs, taxes, free trade, etc., is like the dispute of the travelers about the color of the chameleon, none of whom understood each other, and none of whom were right. While ***this arithmetical extension*** of prices and ***geometrical perversion of quantities*** is going on, the purchasing power of the unit falls, and then rises back, not only to average, but upward as much above average as it had fallen below average. When prices are rising the producer of iron gets, say, 40 bushels of wheat for a ton of iron, and when they are falling, perhaps 30 bushels, or even 25 bushels only, for a ton of iron. While the purchasing power of the unit of money is thus perverted, and thus falling, every debtor takes his chances, and has ***his time*** on the one hand, and when it is rising every creditor takes his chances, and has his time on the other hand. If the unit is falling the drawer of a check who is a debtor is gaining, and if it is rising he is losing. The same is true of bills of exchange, which are, in effect, largely time checks. Gold and silver are the money of the world: they might be equally current all over the world, or equally current only in some parts of the world; but, in point of fact, silver is now current *in a full token sense only* in mono-silver countries, and gold in a full token sense *only* in mono-gold countries. If gold and silver were equally current everywhere, silver and gold in bars and ingots would be money everywhere, *because they are geometrically proportioned* by the various weights of the metallic units of purchasing power existing everywhere throughout the world, as before explained, and every series is, through the coefficiency of weight, resolvable into any other series. The mathematical *cause* or reason of this convertibility is that money is not a commodity, but a mathematical process, *naturally developed* for the conversion of direct into indirect geometrical barter, through an arithmetical medium called money. This medium naturally forms out of the metals, gold and silver, an arithmetical series of units of some particular weight, the weight determining, through its coefficiency, *the length* to which the series shall extend. Commodities at large are the geometricals indirectly bartered through the arithmeticals. The arithmeticals, then, naturally resolve themselves into a divisor, and the geometricals naturally resolve themselves into a dividend. The divisor as a whole has mathematically the same value, whether long or short, the only difference being in the dividend share of the unit. The weight of the unit thus becomes, under *free coinage*, its natural coefficient in finding its place in any series of the world, and for this purpose *weight alone* is sufficient. The units require geometrical apportionment of weight only by careful weighing, to make them money, but geometrical construction by machinery, to make them perfect money. Their purchasing power would, even under general bi-metalism, vary through banking and paper money in different countries greatly, and from other causes slightly, but whatever the variations might be, the payee, by check, bill, or coin, *would take the chances of the variation*, and not the payor; and the same would be the case if, by supposition, — although in point of fact it would be impossible, — an international paper money were in use all over the world, because, the world being thus one country as to money, *the payee would take his own chances of completing the last half of barter in his own locality;* a right which he had by loan assigned to the payor, and the payor afterwards, through repayment, reassigned to him. *If it were a tax or tribute* the beneficial receiver of the tax or tribute ought in justice, for an equally good reason, to take his chances in the same manner. In *point of fact* this is what the payee or receiver of tribute (the Indian tribute, for instance) or tax always does, and is always compelled to do. When gold stood at a premium of 10 only in the United States, but in purchasing power —40, making a real difference of purchasing power against it of —30, an order or bill (without reference to its consideration) drawn abroad on a consignee or payor in the United States by a payor or bill purchaser in England *was payable in a gold currency* having a purchasing power of 100 — 30 in the United States only, which gold stood where the order or bill was drawn at 100 in purchasing power, and would have bought there at 100, gold being current *in both countries*, *local* circumstances *alone* carrying it down in purchasing power or geometrical value in the United States to 100 — 30. If the same money is equally current in two places, and a bill is drawn in one of the places on a drawee in the other place, the payee or order — in other and scientific language, his assignee — takes the money the bill brings him, *subject to all local variations of purchasing power*, and loses nothing, and gains nothing, through its purchasing power elsewhere. He is paid in *his own currency*, whether that currency happens to have the same purchasing power in both places or not, because money is, in point of value, *a mathematical quantity* and *mathematically convertible* through the inverse relations of arithmetical and geometrical values into equations of money on the one hand and goods on the other, geométrical loss or gain in goods being *the important question* always, but, in point of equity and natural justice, the risk of geometrical loss or gain intervening between the loan and payment belongs to the payee and his assignees, and is always carried by them. A bill of exchange being a monetary document, as is also a check, does not, *because it cannot*, have any reference to the purchasing power at the place of payment of the money with which the bill is paid, under any circumstances whatever, and therefore a bill or order drawn in

Calcutta on London, and paid for in Calcutta with silver, ***has no reference to the purchasing power of gold***, which is alone current in England, nor would it have, even if gold were also current in Calcutta; nor has a bill or order drawn on Calcutta in London, and paid for in London with gold, any reference to the purchasing power of silver, which is alone current in Calcutta, and in which it is payable. If the money which buys a bill of exchange is current where the bill is payable, as well as where it is drawn, then the cost above par is the cost of sending the money itself instead of the bill *only;* but if it is uncurrent, then the *fair* and *just* question in settling rates of exchange, is only whether the series where the bill is drawn is arithmetically long or short by comparison with the series into which the bill carries the right of completing *the last half of barter* to the buyer, and not what may be the value of the money in each series as a commodity. The fair question, if the money is uncurrent, is, What is the purchasing power of the abstract unit in each series? and buyers and sellers of bills could settle that question by an average, but gold and silver, while arithmeticals like paper money, are at the same time geometricals in bullion, as well as arithmeticals, and, under monometalism, which makes only one metal current, the conversion is *perforce* a geometrical, instead of an arithmetical one, and the equities of arithmetical difference are converted into geometrical spoliation. If the unit of the drawer carried no valuable commodity with it, and were not convertible into a unit carrying such a commodity, ***mathematical conversion would readily take place***, because, as already shown, the unit of purchasing power arithmetically long by comparison, in the series of the place where the bill or order was drawn, would be arithmetically docked in exchange for the arithmetically short unit of the series of another place called for by the bill or order, while the unit of the latter, being *arithmetically short by comparison*, would, under like circumstances, be lengthened instead of docked.

The only material monetary spoliation through bills and orders, therefore, comes where the unit, instead of being docked or lengthened according to the length of its series (a small quantity under bi-metalism), and thus always treated as money *only*, that is to say, as a mathematical unit, in docking and lengthening, is either *actually sold or bartered* (*not used*, but bartered) as a commodity, or its series docked or lengthened (a large quantity under mono-metalism) so as to produce the same result, without reference to its actual length as money, and its proceeds employed as money in its place. This is what is now being done in mono-gold and mono-silver countries, under the illusion that *the use* of a commodity in the case of gold and silver as money, is in reality the barter of gold and silver for commodities, when the only real barter is in the bullion market, where the fall of either bullion really means not that the purchasing power of the mathematical unit of money which carries that bullion has fallen in commodities, but, on the contrary, that it has risen in commodities, and that the rise of its bullion, when it shall occur, will really mean that its unit has fallen inversely in commodities. In order to enable any one who studies my theory of money to master and overcome gradually the illusion that mankind are carrying on double barter in the place of original, savage, single barter, and that gold and silver are therefore double-bartered, when they are used as money, I advise him to reflect that barter, sale, or purchase is only means to an end, and that if the means can be dispensed with, the end follows without the means. Gold and silver are metallic commodities *absolutely indispensable to mankind* in order to enable them to carry on, not direct, or double-direct, but indirect barter, with a tolerable degree of exactness, and *they are used and slowly "consumed" as commodities when they are employed as money*, as much so as are metallic checks or tickets of any kind; but *this use is a mathematical one founded metaphysically on the eternal principles of mathematical proportion, although it is apparently otherwise*, and it requires searching analysis and masterly exercise of the will to enable one to perceive clearly that the very opposite of what is apparently true is really true. The use of gold and silver as money *is a corporate use*, the corporators, who are the consumers, being *all the buyers and sellers of the civilized world;* while the use of gold and silver manufactured into plate, jewelry, gold foil, gold sponge, silver foil, etc., is the *use of private consumers, who are at the same time corporate consumers of the metal of metallic money.* In order to consume the plate, jewelry, foil, and sponge, they were first buyers, and, for the most part, before they were buyers they were sellers, while in order to consume the metal of the metallic money as corporators, they for the most part sold commodities, and then bought the commodities, plate, etc., with their money, thus indirectly bartering the goods they sold for the plate they bought *through the medium of the units of a metallic monetary series, geometrically related by weight and construction.*

If the true science of money were established and taught, it would be perceived that the grand object sought through general bi-metalism is never to bring the metal of full-token metallic money into market at all, but to keep it out by making each kind of money current all over the world, at the geometrical ratio of 15½ and 1. Probably not ¼ of the metal of the gold and silver money of the world has ever been marketed, and, under general bi-metalism, but a few pounds of either would ever be marketed. Plate and jewelry are manufactured out of bullion, *either in the shape of the metallic unit*, or bars, bricks, or ingots. The metal of these units, bars, etc., has purchasing power or value *in mathematical proportion*, a value very different from, and enormously greater than, that of a commodity, whether sold or bartered. Either metal would have, under general bi-metalism, a value if bartered for the other metal, and as plate it will always have value *in* money; but *as money* it is never bartered, and never bought or sold. The metal has value *by relation to the total of commodities*, divided by the sum total of its units employed in buying those commodities, and outside of that relation has *no money value.* If its units increase slowly, evenly, and equally along their arithmetical line everywhere, *all* prices go up, and if they diminish, on the contrary, they go down. If they remain evenly distributed along the line without any general increase or diminution anywhere, then the increased number of monetary units, if they are gold or silver, carries more metal in its series to every measure of a commodity (wheat, for instance) which has fallen in quantity as a whole, and the remainder of commodities which have not lost quantity call for less gold or silver to every measure, while the total of wheat as one whole, and the total of all other commodities as one whole, call each for the same amount of gold or silver as before. The geometrical fact, modified by intrinsic differences in commodities, is that the total of wheat which has fallen off in quantity still calls for the same quantities of other commodities it called for in equations of exchange, before it fell in quantity itself, and this fact is expressed in money by giving more money for a measure of wheat and less money for a measure of the other commodities. If the money is, by supposition, metallic gold, the gold actually expresses four inverse facts: first, that wheat has fallen in quantity, and gold at the same time risen in quantity; second, that wheat has risen in value, and gold has fallen in value; third, that other commodities have risen in quantity relative to wheat, and gold has fallen in quantity relative to them; fourth, that other commodities have fallen in value relative to wheat, and gold has risen in value relative to them. Gold thus expresses at one and the same time two opposite or inverse geometrical facts, and two opposite or inverse metaphysical ideas of buyers and sellers. It expresses the fact that it has at one and the same time risen and fallen geometrically, in point of quantity, in reference to the commodities it is given for, and at the same time risen and fallen in *value*. *The apparent rise and fall of gold here* is a contradiction in terms: there is no rise or fall of gold, but only a mathematical expression in terms of several proportions, that a measure of wheat calls now, not only for the same number of measures of other commodities as before, but an additional quantity, to be found potentially by dividing all the commodities other than wheat by the total of measures of wheat now on hand, and then dividing the same commodities again by all the measures of wheat on hand before it fell in quantity, and subtracting the last quotient from the first. This gives the difference geometrically, to be added to all measures of commodities as a whole, exchanged for wheat, not, of course, exactly in point of fact, but it is the difference towards which quantities exchanged tend, and as far as the tendency is carried into effect gold expresses the fact, but is no part of the complex fact itself. The expression is mathematical, because it is in terms of several proportions, and the proportions are stated in units, and the units being made of gold, the gold goes with its units in expressing these facts. It is *difficult to understand* how buyers and sellers can be working out mathematical proportions every day of their lives, without knowing it; but such is the fact, and one reason why it is difficult to clearly comprehend the fact is, that they are really working together, not in as close a corporation as bees, or even beavers, but in a corporation, nevertheless. How, it ought to be at once asked, can buyers and sellers work out mathematical proportions without sitting down like school-boys with slate and pencil? The answer is, that each corporator does little or much at a time, just as it suits him, and just as he is able. He may have but little to sell, and, therefore, little to buy with. If he sells, prices are as familiar a language to him and the buyer as the language they use in buying and selling. He and the buyer think of nothing but the price of the article they are selling and buying, in terms of abstract units, whether they handle gold or not, and while they are doing this, thousands of others are doing the same thing with other portions of the same kind of commodity they are dealing in, and many other kinds as well; and without any of them being aware of the fact, every seller is stating in the money he asks and gets, his first member of a mathematical proportion in the units of a *limited* arithmetical monetary series, while the buyer who buys with money received from a sale of his own commodity, is stating his second member of a proportion of the same kind; and when the seller buys he will have unconsciously stated in the same way the second member of his proportion, leaving, as the total practical result, a problem consisting of one complete monetary arithmetical proportion of 4 members, one complete geometrical commodity proportion of 4 members, 3 equations of commodities and money, and inverse proportions of commodities and money. All these complex exchanges and proportions are summed up by the monetary science of the day, *as barter and double barter.* If barter means exchange, as it undoubtedly does in a *general* sense, monetary science is *apparently* correct, *and*, *in the absence of analysis*, entirely correct. There are 3 exchanges: first, the buyer who bought had previously sold goods for money: this is one exchange, and as exchange is another term for barter, it is one barter; second, the seller sold and the buyer bought; third, the seller turned round and bought with his money, which is the third barter. It is all barter and double barter undoubtedly, in the sense that there are 3 exchanges, and the seller is an actor in two of them; but what the real facts are can only be ascertained by analysis. Gold and silver are commodities, and they are *used as commodities* by buyers and sellers in carrying on their indirect barter, *but they are not bartered themselves.*

Gold has risen, as bullion, and silver has fallen, as bullion; but gold has not risen, nor has silver fallen as yet, *outside of bullion*, for if a merchant in London sends 15½ pounds of bar silver to Calcutta, and exchanges it for rupees, by paying two per cent. seigniorage for coining, he can buy goods at average prices in Calcutta, ship them to London and sell them at average prices; and *beside a profit* he will get a pound of gold in sovereigns for his 15½ pounds of rupees. Whether he exchanges his silver for gold at 15½ or only at 18, depends entirely upon how he begins or starts and when and where he ends his equation of exchange. If we assume that it is started with 15½ pounds of silver rupees in Calcutta, and he stands at the silver end of the equation, he leaves the London market with 1 pound of gold in sovereigns if he chooses; if he starts with goods instead of silver, and stands at the goods end of the equation, and takes his silver he gets for the goods to London and buys goods of any kind, whether Indian or British, he leaves the market with $\frac{84}{100}$ of a pound of gold in sovereigns only, instead of $\frac{100}{100}$ of a pound. Inversely the same result has always followed after gold had "fallen," say, 25 per cent. in London in iron and most other goods produced in England, while gold and silver were all the time standing at 15½ and 1 in bullion before the bi-metallic chain was broken. By selling goods for gold in London, a merchant would get, say, 25 per cent. excess of gold above average; he might exchange that gold for silver, send the silver to India, and buy Indian goods geometrically in excess of the goods he started with in London by 1 up to 25; say, 25 per cent. The difference lies between the two ends of the equations of exchange, and which end a man first takes, and when and where he stops. If he started in the last case with gold in London, and stood at the gold end of the first equation, instead of the goods end, he would come out with a loss of 25 per cent. of gold through a 25 per cent. geometrical loss of goods bought in Calcutta. If he sold the goods in Calcutta immediately after buying them, he would lose 25 per cent. in silver and therefore 25 per cent. in gold; but if he carried his Indian goods to London, and sold them for gold, he would make 25 per cent. in gold, and thus recoup his loss. The exact difference to him, *individually*, lies between balancing loss by gain, making 25 per cent. and losing 25 per cent., and whether he is to balance loss by gain, lose 25 per cent., or gain 25 per cent., depends upon which end of the first equation he stands at, and when he stops. Gold is, of course, carried from England, instead of goods, under such circumstances, and every man who is not beside himself leaves London for Calcutta and other ports as a buyer, to make 25 per cent., and *not as a seller*, to lose 25 per cent. For a like reason, in point of profit and loss, but for a different reason in point of science, at this time, and on the Calcutta side, a man who is not beside himself leaves Calcutta when he can, not with money to buy, but with goods to sell, say in London: if he leaves with goods he will not make 16 per cent. necessarily, but he will not lose 16 per cent., and may make profits, but if he leaves with money he is sure to lose 16 per cent., and will not be likely to recoup his loss by profits. Money is the acknowledged token right universally conceded by sellers of buying, that is to say, of procuring goods, whose value is stated in terms of an arithmetical proportion, of which the buyer has previously stated the first in selling, the money being the tangible token units in which the proportions are not only stated, but evidence carried away in the units themselves, that such proportions have not only been stated, but acted upon through buyers and sellers. It is impossible to understand money in the character of a science founded *upon actual facts*, until one can elevate himself, so to speak, up to the level of this metaphysical conception of the human intellect mathematically applied, and thus made practical.

The *ideal of money* is to compensate a buyer in the commodities he buys with money, for the commodities he sells for money, but this ideal can no more be exactly realized in practice, than the ideal movements of abstract mathematical mechanics, by the practical movements of applied mechanics; and not only so, but, on the whole, — looking at the moral forces in operation, — a seller is probably more anxious to sell at high prices, than to buy at low prices, over and above the fact that advancing prices increase the energy of production in some quarters, and create "good times." Because money is mathematically expressed value, and its unit is anywhere and everywhere the abstract metaphysically conceived unit I, which is always I, neither more nor less as a metaphysically conceived unit, a commodity which is called 3 is potentially divided into 3 parts, and the same commodity called 15 is potentially divided into 15 parts. Each unit I in 3 is abstractly (metaphysically) worth the same as each unit in 15, but practically related to that commodity in terms of the proportion 3:15, has 5 times the geometrical value in that commodity, of the unit I in 15, while the geometrical value of all the units in the arithmetical series 3 in commodities is *equal* to the geometrical value of all the units in 15. The danger which lies in the use of this kind of value for the commercial world as a whole, is, *not* the impossibility of limiting the total series of all the money in the world, at an arithmetical point where the number of units in the series varies as a whole, for all practical purposes, but little in its relation to the total of commodities, because it changes slowly in a series of the present length regarded as one series, but in the separation of the series *into two parts*, through mono-metalism, thus destroying the general relation of all the money in the world to all the commodities in the world; making a silver monetary series for a little less than half the commodities in the world, and a gold series for a little more than half the commodities in the world, or, in still other words, dividing the grand dividend of all the commodities in the world into two parts, with, say, 8 per cent. more than half in one part, and 8 per cent. less than half in the other, and thus having *two* grand dividends to be divided by *one divisor each*, rather than one grand dividend and one grand divisor only. If the *whole series*, of which every sub-series is a *subordinate part*, be ten thousand millions, under universal bi-metalism the unit of the series is abstractly I, but its actual or related, and practical geometrical value in all the commodities of the world is approximately $\frac{1}{10,000,000,000}$; if it is only five thousand millions, as gold or the same as silver under universal mono-metalism, the abstract unit, while still I, is worth $\frac{1}{5,000,000,000}$, but the second dividend will be 8 per cent. less than the latter in mono-silver countries, and 8 per cent. more in mono-gold countries, if by displacement and redistribution of metallic units, 8 per cent. too many go to mono-silver, and 8 per cent. too few to mono-gold countries, mono-metalism by supposition continuing indefinitely. Construct an inscribed polygon of ten thousand million sides within a circle, and an arithmetical addition of one hundred million sides would change the length of each side only 1 per cent., while it would change that of the polygon of half the number of sides 2 per cent. To add I unit to the long series is to subtract from the geometrical or dividend value of each unit in it only one ten-thousand millionth, but to add 1 unit to a series of half that length, is to substract one five-thousand millionth. I have called the arithmetical difference between the arithmetical values in the silver series and the gold series, after the severing of the last link in the bi-metallic series, 16 per cent., but it is actually more, as may be readily ascertained by a calculation. I have also assumed that there are ten thousand millions of gold and silver, say half and half, reduced to dollars. The total is usually assumed to be much less, but this is unimportant in respect to the *general truth of the demonstration.* About one thing I have no doubt, and that is, that the total number of units of purchasing power in the whole series taken as one series, is *at least* fifteen thousand millions. A bank note for $5 counts 5 in the series, and a bank credit for $5, which is used as purchasing power and pays like a bank note, must be added, because, under my theory, which includes and explains *all facts, explaining each one, and not attempting to explain away any one,* a man who has $5 credit in bank with which he pays as so much cash, adds 5 units to the divisor which divides the grand dividend. The rise and fall in money is only the rise and fall in the number of units which go into the divisor. The value of corporation property is tangible capital, and this may be divided into a greater or less number of parts: the capital is the dividend; the number of shares the divisor; the greater the number the less the dividend of the unit; the less the number the greater the dividend. The certificates, *even if metallic,* would have value *only in the dividend,* and they are property, in the character of *a right* and not a tangible thing, save as the tangible things they call for are divided. There never was, and there never can be, such a thing as a rise or fall of the metal of a metallic coin outside of its character of bullion, because it is merely, as money, geometrically weighed and constructed units of bullion. It is geometrically weighed and constructed, however, not to "sell" or barter as bullion, because it *can* be bartered without it, but to *use* as money in order to carry on indirect barter. If a miner in camp has gold in quartz, and the amount of gold by weight in the quartz can be closely estimated, he can use it, *not to sell*, but to buy with. *He cannot possibly* sell it, because, if he sold it, he could only get money, and the gold to buy with, *as money*, is worth vastly more than gold to sell as commodity, even admitting that he could by any possibility sell it.

But he cannot sell it, in any correct sense of the word sell, I repeat, for if he can he *only* needs to know the weight. Suppose he undertakes to sell it, knowing *only* the weight in ounces, pennyweights, and grains. The problem for him to solve, if he sells it, is, What is the value of the gold, and how much ought I to have for it in money? If it were copper he would have *no difficulty* if he could find the market price, and make due allowance for freight and handling; but it is gold, and he finds no market quotation save one, and that is the barter value of gold in silver. But he does not want silver, and, if he did, he would get money still: neither he nor the would-be buyer knows, nor can either ascertain, the market price of gold, *because it has none, save silver.* He is therefore unable to use his gold until he finds out *something besides weight.* What is that something? It is, How much gold the *abstract unit of purchasing power called pound or dollar needs* to make it a good paying unit? It is the unit, then, that controls the metal, and not the metal that controls the unit. If railroad companies gave *metallic gold checks* for luggage, the checks would be no more valuable to the owner than brass checks, so long as the luggage continued to be worth more than the checks, and if, by supposition, the checks were redeemable by common consent everywhere and anywhere, in other luggage of supposed equal value, the value to the holder would still lie, not in the check, nor in the check *and* the luggage, but in the luggage entirely. If the tax-payer in India were required to hand over his tax to the beneficial receiver under the imperial government in London, *in gold bars*, he would exchange his rupees as so much geometrically-weighed and constructed silver bullion for gold bars, the rupees going back into circulation, because already coined and ready to use; but the tax-payer and tax-receiver could *never settle with each other* by knowing weight of the bars *only.* Another fact must be ascertained, and that is, how much gold metal the sovereign carries by law, that is to say, by the *conventional practice* *of the community acting through the government.* In other words, to find commodity weight alone is not sufficient for any kind of metallic money, but the *geometrical weight* of the unit not yet geometrically constructed and weighed by itself, indeed, because still in bar metal, must be known; in other words, the geometrical weight, which the miner in camp was *compelled to learn* in order to convert a geometrical into an arithmetical series before he could use his gold as money. In the absence of any such knowledge, and of the ability to learn, *because such a unit had not yet been evolved from the brain of man, like Minerva ready armed, from the brain of Jupiter*, the tax-payer and receiver would be at their wit's end to know what to do with the gold, until they had, after prolonged thought, evolved not only the unit, but the proportion, the series, and the geometrical apportionment of weight, so as to construct the series in a tangible form; in other words, until they had invented money. This would be putting the gold bar to *good use* by constructing a kind of money very hard to change in arithmetical proportion, and therefore steady in geometrical value in commodities.

It is *said* that gold and silver money rose as commodities before the discovery of America and fell afterwards. Such *seems* to be the fact, but it is a mistake: they fell neither more nor less than the wood or iron material of a carriage falls independently of the carriage. If a carriage were needlessly overweighted with material the owner of it would be glad to get rid of some of the weight if he could without spoiling the carriage, and many holders of silver would be glad to get rid of some of the weight if they could without spoiling their coin; but while all new carriages can be made lighter up to the point where loss of material would render the carriage weak, the Western holders of silver cannot get rid of weight any faster than consumers of silver ware will buy it; and the latter buy no more, because they are unable to buy any more at the price *which maintains metallic weight as the coefficient of the silver unit in maintaining the arithmetical length of its series.* Holders cannot make the unit lighter without endangering the coefficiency of the metal, but they can, when monetary science shall be better understood, *deposit the silver*, and avail themselves of its coefficiency, even if the metal be kept in store in bars and ingots. The money unit of gold or silver may be sharply defined as valuable geometrical quantity, intellectually converted into dead geometrical quantity to make it the coefficient of the money unit in carrying valuable geometrical quantities from sellers to buyers. But did not gold and silver rise before the discovery of America by the fact that less and less of it was all the time being required to buy a given quantity of commodities? By no means: the dividend value of the unit increased, *because the number of units in the divisor*, relative to the dividend to be divided, was continually decreasing, and the metal was, as it always is, a coefficient of the unit only in maintaining *the original number of units*, neither more nor less, with which the series started, by maintaining the old apportionment of weight. The metal is an *imperfect coefficient*, because *it cannot of itself*, through human agency, lengthen its series which constitutes the grand divisor, by a new geometrical apportionment of weight as the dividend (commodities) increases, making each unit lose weight in exact geometrical proportion in order that the units in the divisor may gain relatively in arithmetical proportion, nor can it shorten its series by a new apportionment of weight, making each unit gain weight in geometrical proportion in order that the units in the divisor may lose relatively in arithmetical proportion enough to keep the dividend of each unit from falling off; and hence, after the discovery of America the opposite effect followed. It took a long time to distribute the new units *along the arithmetical line of the world*, because communication was more difficult and slower than now: the displacement and redistribution of metal following the now prevailing fashion of mono-metalism will take place in a much shorter time. Had it been possible for the nations of the world to act together, and had they been so inclined in the sixteenth and seventeenth centuries, a considerable distance of the rise of silver and gold arithmetically, and fall of their respective units in purchasing power geometrically, could have been saved by recoinage, weighting the unit of each with double the metal before in use, by repeated and quick recoinages. But this was impossible, and *therefore* there was a loss of geometrical value in the unit of each kind, exactly, or very nearly, proportioned to the difference between total geometrical gain in the dividend, while the divisor was being lengthened, and total arithmetical gain meantime in the divisor. *Dead geometrical weight* cannot be a *perfect* coefficient of the unit in the divisor, because it cannot of itself, through ordinary, every-day, human agency, lengthen and shorten the units in the divisor by new apportionment of weight, as in commodities individually consumed, by reconstruction of the whole series which constitutes the grand divisor, and therefore it will be impossible, by any isolated and empirical attempts at recoinage, to maintain the coefficiency of the metals in two separate and disjointed series. It will be vastly better to let isolated recoinage alone, and *allow compensation for monetary spoliation to come in the natural way*, usual in such cases. Under general bi-metalism the coefficiency of both metals taken together would be sufficient to maintain the divisor at proper length, in view of its present great length, if it were possible (if, indeed, it ever will be possible), to *regulate arithmetically* the extension of paper money and bank credits as *local* parts of the grand series. My reasons for so stating are, that the joint coefficiency of gold and silver would be restored by making both of them *perfect token money* all over the world. Silver is not perfect token money in gold countries, because it is either not money at all, or, if money, its token is gone when the stamp and superscription are gone, to say nothing of geometrical construction; and gold is not token money in silver countries, because it is not money at all. To be perfect money each metal must not only be money, but its *actual token* must be a *given weight to a given unit*, and then the stamp, the geometrical apportionment of weight, and the geometrical construction *are useful accessories, but not principals.* There is another and conclusive, because mathematical, reason founded on a mathematical fact, why weight will maintain its coefficiency hereafter with both metals in one series, by keeping the divisor steady, although it failed to do so at the periods named. In a divisor containing units to the number of between ten thousand and fifteen thousand millions, the geometrical gain or loss of the unit in commodities must be very slow; and for all practical purposes the geometrical value must therefore be steady. One hundred millions will affect the divisor less now than ten millions then. What is wanted now is the establishment of a *new science of money* according to the principles I have laid down. Money has been the riddle of the Sphinx for all ages, and it is time to solve it. Of this Sphinx man is intellectually the creator, and not the creature, and yet the creature having at her creation propounded to her creator the riddle, What am I? which is yet unanswered, is still propounding riddles which he cannot answer; and as a penalty she devours some of his children and pampers others. If she had but one riddle to solve there would be a fair prospect of a solution in time, but the more riddles she offers for solution so many the more does she seem to keep in reserve: all look upon her riddles with loathing; some attempt a solution, and believe that they succeed; but they leave ten new riddles of their own to solve for every one she propounds; and yet it is not their fault, for they work incessantly, honestly, and with great vigor and force; but, nevertheless, they do not succeed. It must be that the creature herself is a riddle, and that her creator has lost the key which unlocks the riddle of his own creation: if the key can be found the creature herself will have no more riddles to propound.

But, allegory aside, for although there may be some fancy in money there is vastly more fact, it is no exaggeration to say, that from whatever angle you look at money and its movements, whether that angle be the "exchanges," "bank credits," bank reserve, bank debt, commodity, barter, double barter, "intrinsic value," "balance of trade," overproduction, underproduction, rise of prices, fall of prices, rise and fall of value, mono-metalism, bimetalism, and other angles, I might say, without number, the fact you see, or think you see, at that angle is contradicted by the fact you see, or think you see, at another angle. Is it not really so? And if it is so, must it not be that what you see, or rather think you see, at each angle is an illusion, which gives way to another illusion at another angle, the illusions chasing and succeeding each other, as it were, in endless succession; and when you come to report upon them and group them into what appears to be a *scientific form*, you retain those illusions *which you see first*, and which may fairly be called the leading illusions, and then try to explain away the others, so as to get rid of as many contradictions as you can? The old mercantile theory, or, as Adam Smith calls it, system, said, Give me all the gold and silver you have, because gold and silver are alone worth having, and I will give you all my goods, something after the manner of King Midas in the old myth. Modern science says this was all an illusion, for wealth does not consist of money. The mercantile system of to-day modifies the old call, not in substance, indeed, but merely in the form of the reason given for making the call. It says, Give me all your money you can spare, and I will give you goods in exchange, and *the more money you have the better.* Modern science differs about the propriety of this call, but when she is most severely logical she insists that such a call is founded on illusion and not real fact, because the movements of gold and silver are "entirely unimportant," inasmuch as there is always a surplus of "*that commodity*" on hand everywhere, which is not actually wanted: *the actual fact*, nevertheless, is, that gold and silver move without any reference to scientific theories or scientific logic, regarding the stern logic of facts only. The *logic* of modern science says paper money has, in science, ***no value;*** the logic of fact says it ***has value equal to gold in a great many cases;*** in many cases it has less value, and in some becomes entirely worthless, losing all the value it ever possessed. The logic of modern science says money "measures values," and that a thing which measures must be homogeneous with the thing measured. There can be no sounder scientific logic than this, and yet the logic of fact replies, in mockery, that a piece of paper which has no value "measures" the value of commodities in the ***same manner*** with a piece of gold ***geometrically shaped and weighed, because*** not one man in a thousand actually knows the weight of the gold coin, and if it has the shape, color, and size of $5 in gold, ***by that token*** he knows it to be $5, and by the ***token*** of engraving, general appearance, signatures, etc., he knows a $5 bill; and one token is as good ***for him*** as the other, and the paper most convenient. The logic of modern science says (to use a new scientific word which has come into use through the "greenback" scientists of the day) that the government of the United States cannot by its "fiat" create value in the "greenback," because something cannot be created out of nothing. The logic of fact, in the mouth of the greenback "fiatists," replies, that the government of the United States has issued paper money, which has the same value in exchange with gold now, and had nearly the same value for some time, while it was inconvertible. The logic of modern science says that the present silver dollar of the United States, which is coined in the geometrical proportion of 16 : 1, has inherent and positive value in exchange for goods to the amount of $\frac{87}{100}$, the remaining value of $\frac{13}{100}$ being token value only ; the logic of fact says that this double proposition is false from some angles, true from others, and at the same time contradictory. It is contradictory, because it is metaphysically and mathematically impossible to have two kinds of value in the same thing; it is all barter value, or all token value, and it cannot be barter value when holder, buyer, and seller do not know the weight of the coin. Therefore it is all token value, and if it is token value in this coin it must be token value in all coins, the silver having no value in exchange as commodity, but only as the coefficient of the unit I dollar in maintaining its geometrical value, not in the silver, but in commodities at large. If the silver be uncoined (to coin a word inversely) with a hammer, its token value is entirely gone in the United States, but it still has weight, and by *that same token* it is good money as sycee silver in China, and at little or no expense for recoinage by that same token of weight, it is good money in all silver countries; and not only so, but because it is worth 3 per cent. more than coins with 3 per cent. less silver in proportion to gold, the United States will lose its silver, in all probability, before the prevailing geometrical ratio of 15½ and 1 becomes the commodity ratio of silver and gold. The uncoined silver of a dollar is therefore worth in the United

States, as commodity, $\frac{13}{100}$ less than when coined, and hence the actual fact is, that instead of the silver dollar being token value for $\frac{13}{100}$, and commodity value for $\frac{87}{100}$ at the same time, it is *imperfect token money* in the United States for $\frac{100}{100}$ only, and in silver countries perfect token money for the most part at $\frac{103}{100}$. As bar silver it is worth only $\frac{1}{16}$ of its weight in gold, but if it is used as money in silver countries to buy goods, and the goods are sold upon average terms in gold countries, the holder will get not merely $\frac{1}{16}$ in gold, but $\frac{1}{15\frac{1}{2}} + 3$ per cent. over in gold for his silver, to make up for the 3 per cent. difference between 15½ and 16, and profits beside.

But if the United States are so unfortunate as to coin silver enough, even at 16, to drive out all the gold of the United States, because it is profitable to recoin it abroad before silver gets back to 16, it will be compelled to pay a premium on gold, amounting to the difference between 16 and the actual market rate of silver, in order to pay holders of United States debt, whether foreigners or citizens of the United States residing abroad, with gold, or pay in bar silver, adding premium, and enough more over and above premium to insure against adverse variations of premium. France will be compelled to do the same thing if she loses all her gold and has only silver left, because the world is one country to pay debts in, and if a creditor owns a debt which is payable in gold by the implied consent and will of the payor, the latter must pay him in gold, if he resides where gold is the currency. The United States have intentionally made their debt a security of the commercial world, and must keep it good where they have not only allowed, but intentionally caused, it to go. By the logic of actual fact, then, the silver of a silver dollar is, in the United States, an imperfect token to the extent of $\frac{87}{100}$, and a perfect token in silver countries to the extent of $\frac{103}{100}$; a silver commodity, worth only $\frac{87}{100}$ in gold commodity, and, at the same time, through goods, $\frac{103}{100}$ in silver money worth $\frac{103}{100}$ in gold money. Here are more riddles to solve than the Sphinx ever proposed herself, and they can be answered only by answering truly the first riddle, What is money?

But, again, the logic of modern monetary science, which is ancient as well, says that there is such a thing as demand for money, because, being a commodity, *it can be demanded as money*, money itself being a commodity, although at the same time the holders of silver would be glad to have it reduced in weight instead of being increased, because by a mathematical necessity it is now inconveniently heavy. The logic of fact says, on the contrary, that there is no such thing as demand for money, in a commodity sense, because it is not wanted by individual consumers, but by corporate consumers, who have need of money, not for its own sake, but to enable them to procure those commodities which all members of the corporate body *need, and therefore demand*, and for that purpose one quarter of the present mass of silver would be better than the whole and mathematically worth the same. To demand money is to demand only the means whereby commodities can be procured, in other words, the use of the process or contrivance for indirectly bartering commodities, which sounds absurd. Commodities are demanded *through the process*, and not the process through the commodities. Monetary science is logically bound to say, with John Law, that money can be issued to the extent of all the property in the world, because, money being, according to that science, a commodity itself, there is no *necessary* limit to it, and having commodity *value*, that value can be indefinitely extended. The logic of fact says that money cannot be indefinitely extended, because it is no part of the dividend to be divided, and indefinite issue is only indefinite extension of the divisor or number of shares into which commodities are divided. Therefore there can be no indefinite extension of money. Modern science says that silver has fallen 16 per cent. in gold precisely as copper falls when it falls 16 per cent. The logic of fact says that it is exactly the reverse, because the "value of silver," assuming it to have any commodity value in exchange for goods, over and above its arithmetical value in terms of a proportion (the assumed fact is not the actual fact), is actually inverse to its commodity value in exchange for gold as commodity: if gold, as commodity, falls 8 per cent. in exchange for silver as commodity, this *actually means*, that instead of there being 1 pound of gold in the market for every 15½ pounds of silver, there is a geometrical shortage, so to speak, of 8 per cent. on the part of gold in the bullion market, but all the gold as commodity must always be worth all the silver, and all the silver as commodity worth all the gold in the bullion market, according to the law which governs the exchanges of commodities, and therefore, while all the gold is thus *always and only* worth all the silver in the bullion market, there is *at the same time 8 per cent. more gold money in the market than silver money*, and hence, while that gold, even if geometrically 8 per cent. less by weight than it is (that is to say, if it were in point of mere weight at average), would still be *worth as much as it is now in silver* as a mere commodity, nevertheless, as money, the gold in the market is actually and arithmetically worth 8 per cent. more than the silver, because it is arithmetically more money by 8 per cent. at the prevailing geometrical or mathematical ratio of 15½ : 1 than the silver. This is the reason why bankers, brokers, and merchants *broke* the "fall" of gold so rapidly, after the discovery of gold in California and Australia. There *was no fall of gold in dividend power* any more than in silver, because an ounce of gold arithmetically, as money, would buy as much as 15½ ounces of silver; the dividend fall attached to each arithmetical unit of gold and silver, *equally and evenly*, if, and only so far as, there was any fall whatever; and the same is as *true of silver now* as it was of gold then, but the dividend area of silver is diminished now, and before silver can be distributed to silver countries the gold and "subsidiary" silver needed under the new distribution for gold countries must be distributed, while the unit of silver itself must as money eventually fall in commodities, by adding to the silver divisor in silver countries in excess of addition to the gold divisor in gold countries.

But, again, modern science says that 2 ounces of gold are worth twice as much as 1 ounce, *because* there is twice as much commodity *for sale in it*, as in the 1 ounce; the science of fact says that it is worth twice as much, *not because* it will *sell* for twice as much, for it is never sold at all, *but because it will make twice as many units* to put into the grand divisor, and will thus furnish twice as much buying power, and not because it will furnish twice as much selling power. The science of the day says that if the creator were to uncreate his creature, gold "commodity," it would still be his creature neither more nor less than now; the science of fact says that what man has created he can destroy if he chooses: the creature is not the material substance gold, but the *immaterial mathematical contrivance*, *metaphysically created*, *and liable to be metaphysically destroyed.* The *value* of money in exchange — quite as satisfactory to him intellectually as the inherent and positive value which it displaces — is what man has created himself, as he has created language, sculpture, painting, stock in corporations, and incorporeal rights of all kinds, but the value of money which, in general terms, is an incorporeal right, must be corporeally proved before it can be corporeally exerted. The value *must take on some kind of form which becomes its token*, and the *actual* and not *illusory* question — no matter what may be actually said, thought, or believed to the contrary — is, What is the best form as the best means to insure the real end?

The value of the unit of money embodied in metal lies not in the metal, but in the idea made matter of corporeal fact in, and inseparable from, the metal, as an idol, statue, or painting has value in the idea made matter of fact in the material of the idol, statue, or painting, but inseparable from the material. Money is a *realized idea*, as the idea of Minerva in the brain of Jove was realized, corporeally, in her appearance ready armed, and the idea of fire in the brain of Prometheus, by the fire he is fabled to have stolen from heaven. Other ideas have been, and are being, continually developed in like manner in *some* particulars, but the *grand idea of money value is exceedingly complex*, and to understand it *clearly* one must think very metaphysically and mathematically, so to speak, and at the same time very practically. He must convert his common sense into uncommon sense, allowing the latter, through general adoption, its own time to go back by another inversion to common sense again. The Ptolemaic theory of the universe was the theory of common sense *plus* some very ingenious explanations of science, to get rid of the force of certain facts which seemed to the scientific mind to militate against the theory. The Ptolemaic theory was, perhaps, quite as metaphysical, and, perhaps, more metaphysical than the idea of the Copernican theory. It was also very mathematical, and above all things very practical, as it still is, in its application to many practical sciences. There is *some* analogy between the illusions of the science of the great Ptolemy and Tycho Brahe and those of the monetary science of the day: the particular difference is that the latter, while very practical in one direction or tangent, is very unpractical in others, and its metaphysical, mathematical, and practical ideas are altogether contradictory, so far as money is concerned, and little better than chaos itself. The first and most important end to be gained by the invention of money was, and still is, what I call indirect barter, by the intervention of tokens, in the place of direct barter, thus enabling a man to barter off his commodities one day, and have some one barter back commodities to him the next, or some other, day. In this manner he directly gives away his goods to some one who has, on a previous occasion, directly given away his own goods; and whenever he buys, another directly gives back to him, as a buyer, goods in exchange for the goods which he has thus given away directly as a seller; the result, as to him, being an indirect exchange of his goods for other goods by means of four direct gifts of goods for tokens. The common medium, which is at the same time "common denominato of values" between the geometrical totals of goods thus exchanged directly, or on one tangent, so to speak, upon one side of this man, and indirectly, or on another tangent, upon his other side, is called money. Is it possible for this medium to be *intellectually recognized* as a geometrical total or quantity, *between the other two totals*, which *undoubtedly* are intellectually recognized as geometrical? Is it not *inconceivable* that the units which state, compare, bring together, or separate geometrical quantities should *themselves be recognized as geometrical quantities* in the eyes of the intellectual man, when they only state the *relations* of geometrical quantities? Surely it is for me inconceivable, but it seems to me quite conceivable that my, or another's, intellectual man has the intellectual power to waive geometrical quantity in a series after it is constructed and when it is used as money, and intellectually convert it into an arithmetical one, if I call the intermediate geometrical totals *so many units without regard to the quantities they carry.* This I believe to be the true metaphysical idea, which is mathematically expressed as an idea in the terms of the intervening units, whether they carry the most solid or the lightest materials in the world with them. If they are metallic they carry, through man, their maker's aid, the metal he has given them. He never made the metaphysical unit of comparison, but, finding it on hand, used it *to effect his own purposes and carry out his own plans.*[1]

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[1] The exact idea can be communicated most clearly by itself in a

The employment of the unit in a monetary character meets a want which is, so to speak, *after language, his want of all wants*, as the member of a corporation, and this unit, although it is necessarily and naturally employed as an *unbodied unit* to state his idea of the relations of all geometrical quantities when they are brought directly face to face, and either with or without an interested owner behind them, cannot be metaphysically and mathematically carried away and, *still unbodied, be used as money.* The relations of a geometrical

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note. In geometry, magnitudes and their geometrical relations are demonstrated through the magnitudes themselves, physically represented on paper before the eyes, and the relations are expressed in abstract units, — not less than 3, — and designated 1 + 1 + 1, etc.; the value of I as related to any magnitude being limited by the number of I's in the series employed. But if algebraical notation be resorted to, the physical representation of the geometrical magnitudes before the bodily eyes may be dispensed with, and the relations of the magnitudes demonstrated in abstract terms, a, b, c, d, etc., which abstractly stand in the place of the magnitudes. But in production and trade, geometrical quantities bought and sold are actual, and not represented, quantities, having also very complex relations by intrinsic utility as well as magnitude. To relate these magnitudes and their quantities for buyers and sellers by a, b, c, d, etc., embodied and made tokens, is impossible, because it would require as many bodies as the Chinese language has words. If it can be done at all, then, it must be done through 1 + 1 + 1, etc., each of which has the same body, and that body is I. Can it be done? The practical answer is, that it has been done for ages by giving I a name of some kind, like pound, dollar, livre, franc, etc., and making metallic weight of gold and silver the coefficient of 1 pound, 1 dollar, etc., to *demonstrate* mathematically its value all over the world to the 100th part of a grain. 2 ounces of gold are in related value *mathematically* twice I ounce, *because* the unit I of a series, having 2 ounces to each unit, has twice the value in commodities of the I in a series whose units carry only 1 ounce each, 2 ounces to each unit making a divisor, a proportion, and an arithmetical side of the equation of exchange only half as long as that of 1 ounce to each unit.

quantity, nevertheless, can be stated generally, or, in other words, half stated, to-day in units of a *limited series like that of money*, and to-morrow the statement can be completed in some other geometrical quantity, as in case of mutual mercantile accounts current; but the *unbodied* units must be *embodied or written out* if they are to be *carried away*, and used *not only* as units to complete the half-finished proportion which a seller has on his hands by complementing it with the half-finished proportion of some other seller, but also to complement the equation by which he parted with geometrical value by *another equation*, through which he gets back geometrical value. To have *perfect* money his embodied units must carry as their coefficient a solid substance like gold and silver, of all other things best fitted to be carried to every part of the world, *and to demonstrate everywhere and anywhere* the rights of the holder and carrier. It is essential to keep the series which constitutes the grand total of these embodied units *arithmetically steady*, and it is vastly more important to keep every subordinate part of the series steady, whether, on the one hand, we regard the whole series as the sum of the distributed units out of which the arithmetical sides of the proportions and the equations of purchase, having value by relation only, are made, or whether, on the other hand, we regard the whole geometrical total of commodities as a dividend of which the sum of the units is divisor, or only the subordinate geometrical totals of commodities, of which a subordinate part of the series is divisor. Looking at the process from the first tangent, it is indirect barter through the indirect exchange of geometrical quantities, the unbodied units of proportion and the embodied token units of equations of purchase intervening: looking at it on the last tangent it is a grand or subordinate dividend of commodities in the hands of all producers and owners, who are daily, hourly, and momentarily giving up their part of the dividend which they do not now need, for tokens which will enable them at some other time to receive another and, *as nearly as can be*, equivalent part of the dividend which they will need. To add to the geometrical value, by relation, of the arithmetical unit between these periods, is, for the most part, innocent geometrical spoliation of the owners of commodities to compensate buyers for a previous innocent spoliation committed by producers who have geometrically disordered the relations by quantity of all commodities, under cover of a rise and fall, not *in a commodity gold, nor in a commodity silver*, but in the unbodied, abstract, metaphysical units *of deposits*, which are too much in excess of the units of gold and silver, which, in an embodied form, are given and taken for geometrical quantities in the dividend. The theory of common sense and of monetary science is, that it is *the metal* of the metallic unit, which rises and falls *as a commodity* in all cases; the theory of fact is, that the *unbodied* unit rises and falls in the inverse proportions, the equations, and the divisors, and takes the bullion of the embodied unit along with it, and that it cannot intervene between geometricals (commodities) without doing so; the true science of the *whole subject* being that *the metal does not subordinate the wills and the wants of men to itself*, so to speak, because they *need it and must have it as individual consumers* of money, but *they subordinate it to their own wills, because they need it, as consumers of the metal in their corporate capacity*, in order to gain another end by so doing; and that end is, not to consume the metal individually, but by using it corporately to enable themselves to consume each other's spare products individually, the products of their own, which consumers consume individually, not being arithmetically valued in *actual* exchange, *because* they are *not* exchanged. The gold and silver in the money, not being consumed individually, is consumed corporately through the consumption of one buyer and seller, added to that of another buyer and seller, indefinitely; and *this corporate consumption which is itself a constant exchange*, puts on the illusory appearance of a barter of the metal of the unit for the commodity it buys.

Whoever *can see* the *full* force of this reasoning can understand money, and rid himself of illusions, *if he will follow it up*, for if this were the only illusion, it might be sufficient to overcome this one only, but there are thousands of others beside. Two ounces of gold in forty dollars are worth twice as much as one ounce in twenty dollars, and two ounces of platinum, not in dollars, are also worth twice one ounce of platinum. Both are commodities and both *may*, as commodities, rise and fall. *Where* is the difference? The difference is, that the value of the gold is *conventional as money*, while being also commodity, it is *not conventional as mere bullion*, but the value of the platinum is *not at all conventional*, being that of a commodity *only*. *As a commodity*, the gold has value in silver, because both are commodities, *although they are at the same time money*. If the money value of the gold is greater than its commodity value in silver, it will *all* be used as money, and the same is true of silver. When gold fell after 1850 in bullion, *there was no fall of the gold as money*, nor is there any fall of silver as money now. The abstract units which carry 15½ pounds of silver in mono-silver countries are worth as much as money (arithmetically) *in commodities*, as the abstract units which carry one pound of gold in mono-gold countries, and perhaps a little more at this time. *It is the mathematical inverse proportion* into which the abstract unit, having value by relation as money, carries its metal, which makes that metal, so carried, geometrically inverse in potential value to the potential value of the *whole of the same kind of metal in the bullion market, through the commodities it buys as money*. The inverse action or relation of the abstract unit to commodities, in expressing their geometrical rise and fall of quantity, carries its bullion with it without reference to the bullion market, save only this very important qualification, that under general bi-metalism, both units being not only geometrically weighed and constructed, each kind by itself, but also conventional equivalents *in a fixed geometrical proportion*, say 15½ : 1, it is impossible for any metal to fall or rise in commodities *by itself independently of the other*, because, being in the same series, the two metallic units are arithmetically interchangeable, indirectly through goods, and therefore if, by supposition, gold falls 3 per cent. in bullion, by rising in bullion geometrically in excess of silver 3 per cent., the *gold in the bullion market is*, when *directly exchanged, only worth the silver in the bullion market as a commodity to put to use in the great corporation of consumers who are buyers and sellers*, or to individual use in the hands of individual consumers of gold-plate and other manufactured gold commodities; and *therefore a money profit of 3 per cent. can be made, not on all the gold in the world*, but on the *small part* of it which happens to be in bullion, and hence silver, in coin, is carried at once to market and exchanged for gold; and the gold being taken *out of* market, and silver *put in* the market, the fall of gold is (speedily) broken; and the same rule applies to silver. If there were *a fall of 3 per cent. in gold in exchange for commodities in such a case*, who would undertake the feat of bringing silver from all parts of the world to exchange for gold, and be at the expense of coining and distributing it so rapidly? The actual monetary fact in such a case is, that out of every 100 dollars of money in the bullion market, bullion being both money and bullion at one and the same time, there are 53 dollars in gold and 47 dollars in silver. Whatever the change may be in bullion, whether it be much or little, the value of the units of gold *or* silver money actually in the bullion market, *as one whole of gold or silver*, in buying commodities, *is always geometrically inverse to its value as bullion under all changes;* if the unit of gold falls 25 per cent. in London or New York for commodities, its metal is inverse by 25 per cent. to the gold in the bullion market, *which has not changed at all.* Under mono-metalism the same inverse action prevails as under bi-metalism, but *without any compensation*, and hence there results monetary, and through monetary geometrical, spoliation. The gold in the market is now as always worth all the silver in the market, but there are now 18 ounces of silver instead of 15½, to 1 ounce of gold. While, however, the 18 ounces of silver are worth only 1 ounce of gold *in bullion*, the 18 ounces of silver *will buy 16 per cent. more goods* in a mono-silver country, say India, and carry them to London, than the ounce of gold will buy in England, and carry to Calcutta. The +16 per cent. of arithmetical purchasing power or value is on *the side of the silver* in the bullion market, because there is 16 per cent. more silver there than gold, but the complement of the —16 per cent. of geometrical value in the bullion of silver, reckoned in gold, is inversely + 16 per cent. geometrical value on the side of gold, which is itself in weight geometrically — by 16 per cent., while silver is in weight inversely and geometrically + 16 per cent. Hence the rate of exchange is now *arithmetically* — 16 per cent. against silver, under universal mono-metalism, whereas under universal bi-metalism exchange would be *in equilibrio* all the time, or so near it that the difference would be small, and even *if*, by supposition, great, unimportant. The *inverse action* of the abstract units of money can only be compensated through bi-metalism, regulated paper money, and regulated bank credits. If any one commodity rises, the abstract units rise in proportion for that commodity, and fall in proportion as to others, making arithmetical rise inverse to geometrical fall, and arithmetical fall inverse to geometrical rise; the units rising and falling, *as they ought, in order to express the idea* and carry it into effect; thus causing their dead metal to rise and fall *at one and the same time*, while the same amount of metal is stationary in bullion. The dead metal is the coefficient of the units in keeping their number steady, and in determining the token value of the units it embodies all over the world. Two ounces of gold, therefore, are worth one ounce because, and *only* because, it furnishes twice the number of units. Weight of gold or silver has *no value* in commodities in and of itself, until not only weight in general is known, but also the weight *the unit of the local series carries;* and that is fixed in every country. Four sovereigns in gold are worth four sovereigns, not merely because they carry, say

1 ounce of gold taken together, but because the apportionment of that amount of metal to the 4 units of purchasing power, in rigorously exact geometrical proportion, makes the gold series 5 times *as short* in England, and only ⅕ *as long* as it would be if the abstract unit only carried ⅕ the metal. This is the great mathematical fact of all others, which is concealed by the veil of the monetary Sphinx from the eyes of the human understanding. The Sphinx is the creation of man in his corporate capacity, as much so as his language, but he has not succeeded hitherto (in that corporate capacity) in discovering what his creature really is, although a great deal of labor has been expended in scientific investigation, to attain to the science of the Sphinx, and in poetry, to attain to the poetry of the Sphinx. The poetry hitherto has *actually* come nearer to the science of fact, than monetary science itself. Man is mathematically spoliated and mathematically compensated by his creature, but he has not yet found out how it is done on a minor scale, and still less how it is done on a grander scale.

Inequality of fortune (accumulation of capital) is absolutely essential to the progress of mankind, but the great question of the day is, whether it is not being carried farther than the well-being of society, as a whole, requires. This is the *real* cause of what are called the wrongs of labor: there are no direct wrongs of labor to be charged to capital, but great benefits, on the contrary, to be credited. In the United States and England, but more especially in the former, the most prominent economical facts are the enormous advance in the standard and average cost of living, in excess of average earnings, the depopulation of the country by natives, who give place to others of whom many are not natives, in order to go to cities, whose growth is already largely in excess, economically, of that of country population; and, above all other considerations, the lottery of business, which ought to be made *less a lottery* than it is. The political crisis came upon Rome much quicker than it could have done, had it not been for the treasure carried to Rome from the conquered provinces. This was monetary spoliation, committed under the illusion that *there is wealth in a human contrivance or process in excess of the results intended by it.* To give buying power, largely in excess of selling power, is to commit geometrical spoliation at the cost of many, without *really* enriching anybody, and it is the unregulated exertion of buying power in excess of selling power, which is the cause of the bankruptcy of capital and the resulting loss of employment by labor, allowing men to reap where they have not sown. The Sphinx devours her creator by deluding him with the belief that she is a solid body, not of his own individual creation; but when under that delusion he reaches out to grasp her she is gone, because, while she is not a corporeal being of his own creation as an individual, she is an incorporeal being of his own creation as a corporator, and her existence depends apon the will of the corporation. His character as a corporator is an intangible, but very important practical fact, and her character as a creature of the corporation is equally practical, although equally intangible. The great British corporation has destroyed her under one color, and recreated her under another, and the German has followed suit; while the great French corporation and her allies are anxious to hold her in both colors, if possible, and the great American corporation has resolved, without knowing it, that she shall be seen for the present both in yellow and white, but, after a time, only in yellow, with here and there a little white. Of course I do not pretend that I have been writing poetry, for that is outside of my pretensions, but I believe I have been stating fact in the most instructive form possible. All these great corporations have left private consumers in the possession of all the silver plate they possessed, without *even pretending* that they had a right to abolish its use, because that would be *an impossible thing*, although it suits *the humor* of the subject, to suppose that the attempt was made. Let me, for one moment, suppose a clause to this effect to have been inserted in the German law abolishing white and creating yellow. Looking *through* the humor and the symbol, at the real meaning in fact of such a "fiat" as this, *there is no absurdity in it*, if the common-sense view of money, from the common-sense stand-point, and not the metaphysical and mathematical stand-point, is the correct view. To abolish the use of silver plate could only mean that silver plate must all be sold, and no silver plate bought, allowing by implication gold plate to be bought without limit. Could such a "fiat" be carried "practically" into effect? In *my* opinion it could not, and, *to say so solemnly,* is only a piece of ironical good humor. But, seriously, why could it not be done? Because the use of silver plate is a *private use* of individual consumers, and a government corporation could abolish itself much more readily than it could abolish the great end and aim of its own existence. Private consumers, then, are intangible; the "fiat" is as to them only *brutum fulmen.* Silver plate embraces, perhaps as a general term, one third of the geometrical total of silver product, and its use by private consumers is *intangible.* But the German "fiat" has abolished the use of silver as money, substituting the use of gold, which is given for the silver by the government corporation to every corporator, with a little silver for small monetary use. How *can* this be done if the other *cannot* be done? The answer is, that no matter what may be said, thought, or believed upon the subject, it actually has been done, and can at any time be undone. But what is *exactly* the thing that has been done? It is not the *abolition of silver*, nor is it the *abolition of the production of silver,* but only of the *corporate consumption* of silver for monetary purposes. The private consumption of silver belongs exclusively to private individuals, who, in that character, *are outside* of their corporate capacity, and who have the power, if *they* choose, to sell their silver ware and buy gold ware as far as they are possessed of the means; but the question of *corporate consumption* is *a corporate* and not an *individual* question, as the question of *private consumption* is a private and not a corporate question. It is only the *corporate use*, then, which the corporation has abolished by its fiat, and that use means corporate consumer's use, or, in other words, corporate consumption. It is, in other words, *the corporate consumption of silver as money*, which has been abolished, and not the production, the consumption, the *sale, and the purchase* of silver. *Therefore* the corporate consumption was neither the sale nor the purchase, neither was it the *barter*, of silver, as *monetary science affirms*, but its corporate consumption only. What was that consumption? It was using and wearing it out in keeping and passing it; and the passing was neither buying nor selling, nor was it bartering. Nevertheless it passed, and by passing took the place of something that was sold for it, and the latter was a commodity, intended for private consumption. But was not the silver that passed a commodity also? Unquestionably, in the highest degree, if you please, and intrinsically very valuable, but the *value* in this case was invaluable, because it was not intrinsic; consisting only of a service which is very valuable. But had not the silver intrinsic value in the intrinsically valuable commodities it bought? The commodities were intrinsically valuable and actually valued by the silver, and the silver commodity which bought it was intrinsically valuable, but *not* *then valued*, being the mathematical medium of valuation only. The value of the commodity silver in exchange for commodities was the intangible and immaterial right assigned by the buyer to the seller in the money he received, to buy other commodities anywhere in Germany, in certain geometrical proportions, indicated by the full and complete token of silver weight, *even to a grain;* the weight being *not an imperfect*, but a full, complete, and perfect token of right and coefficient of the unit, in showing the extent of its right, whether the token carried a face and a geometrical construction or not. From this angle, the mathematical value of the unit of money can be seen, as distinguished from the "commodity" value of the metal. There is, and there can be, no perfect money now but gold and silver, but they need not be *handled* in order to be used, if they can be used without it. The German corporation having resolved to consume silver no longer, except to a very limited extent, and to consume gold in its stead, had on its hands this problem, How to exchange their silver through the head money office of the corporation for gold. Was the silver sold for gold, or was gold bought with the silver? Surely not, for if this could have been done, in *any correct sense* of those words, it must have been a sale or purchase on individual or private account. A sale was impossible, because a sale is the first half of barter, and a purchase afterwards by the seller in that sale his second half of barter, whereas in this case the head of the corporation bartered silver directly for gold. If the barter *had been indirect*, it must have been a sale of the silver for a commodity other than gold, and then a purchase of the gold with that commodity; but *even to name such a process* is enough to show its absurdity. It was a direct barter, then, of the silver for gold: the silver found a market *in the gold, and the gold found a market in the silver.* Much of the silver had cost the par of 15½ : 1, but it was bartered largely at 16 or even 18 below that par. Who lost or who gained by that barter? The corporation has lost nothing as yet in commodities other than silver, and the silver was bartered off for gold, *to make geometrically weighed and constructed cylinders of 20 marks* and 10 marks each for the most part. If there are 16 per cent. less gold marks now in Germany than there were silver marks before (which is really not the fact, of course), this is not a loss to the corporation which can be counted in marks, because the abstract mark must have risen in dividend power in proportion; but in all probability there is the same number of marks, counting the subsidiary silver, and, if not, some members of the corporation may have sustained some geometrical loss of commodities in selling commodities for the gold: but this is a matter of comparatively little importance by the side of matters of more importance. The German gold has gone into circulation and taken the place of the silver, but it has been marketed once and finally in the silver, and *will not go to market to be intrinsically valued every time it is* *consumed in the process of indirect barter.* The intrinsic market value of the gold has no more to do in this process than the intrinsic value of the materials of a carriage or railway coach with the use of it. The illusion that the corporate consumption of the gold in paying and receiving it, or putting it in bank, and taking it out again only to put it back again, is the direct barter of the commodity gold, when it is, in point of fact, only a corporate consumer's use of it, whether it stays in or comes out, has given rise to *the false idea* that a bank deals in what is called Bank Credit, when it is only a naturally developed *economical use* (a dangerous use at times) of the process. A bank cannot deal in credit, for that is something *which really cannot be thought by any one*, in the ordinary sense of the word, in such a manner as to give an intelligible account of it. There is one sense, however, in which there is a great deal of truth in it, but that truth cannot be perceived as long as one supposes that a bank, which has a reserve of 15 per cent., has a gold commodity kept for sale, instead of a deposit, of which $\frac{85}{100}$ are in the *unbodied* units of purchasing power, which can always be paid in an *embodied shape* in silver or gold over its own counter, or the counter of some other depositary, *if called for*, not in the character of a commodity *bought or sold*, for neither banker nor customer perhaps knows the weight, but in the character *of so many unit tokens by weight*, forming an arithmetical limit *at 15 per cent.* to loans. *Until it is known* that the metallic tokens are not merely a *metallic* commodity limit, but an *arithmetical* limit *at that point*, — if that be the point, — it will be supposed that a bank deals in "credits;" the only truth in such an expression being founded on the *mathematical value* of the abstract unit of comparison and proportion and the token unit of purchasing power. That truth is exactly this: There was no money until there was a commerce in commodities, and hence there were commodities to barter before there were any bartering units *embodied*, except that possibly there may have been cases where they were used in direct barter, to aid the memory. When money first went into circulation, a holder of commodities was the only man who could get money, unless he made it himself, and there was a stern limit to his power in that direction *as soon as gold and silver came into use.* For the most part, then, as now, in a country like France, the limit of buying power was very nearly selling power: a man must have not something to sell, merely, but he must actually sell it, before he can have the power of buying. Every man lending money in France is limited in his loaning power very nearly by his own selling power, or that of others, or both together; and hence there would be a rounding off, so to speak, and a geometrical harmony in production, with metallic money distributed all over the world evenly, under this natural limitation of buyers by sellers. Loans would be made freely, but prices would be kept at an *arithmetical* level, by keeping commodities at *geo-*

metrical level, and there never could be a serious deviation from geometrical level as long as loans were limited *naturally* in this manner. The loans in excess of this natural limitation come through banks, because the limitation is *actually passed in every loan a bank makes*, and in every paper dollar issued in *excess of so much coin retired*, whether by government or banks. The geometrical *loss of equilibrium*, which immediately follows periodically, is attended by "good times," until it goes so far that there is a geometrical reaction, which is attended by "bad times," until there is restoration of equilibrium, which is after a time again past, and the cycle has completed itself, only to begin again and proceed as before.

The remedy to be desired is, not to stop the increased energy of production, which results advantageously for some, unfortunately for others, and disastrously for many, but to regulate it in the interest of the whole corporation, conservative bankers and, in a just sense, all bankers inclusive. The geometrical excess on one side is the complement of geometrical defect on the other. If there is a geometrical excess by 25 per cent. of iron, the great commodity of civilization, there is a resulting and corresponding geometrical defect in commodities of the kind consumed in producing it; for if there were not there would be no geometrical excess of iron, and if the producers of the excess *could not, through the inverse arithmetical value of money*, have distributed upon some members of the community a large part of the geometrical loss of the iron, in commodities of that kind as it was being produced, it never could have progressed so far before it was checked by reaction: the reaction would have begun earlier and the loss would have been lighter. It is *this* kind of credit in which banks deal: the credit *given the banks* is by depositors who have cash of their own to deposit, and deposit it, still using the money as their own, as they naturally must do, because, having completed the first act of barter by selling, they have, and also retain, the right to complete the second by buying, except so far as they actually assign it to others by loan.

The use of the deposited money by the banks, then, is arithmetically in excess of the loans of depositors, who deposit cash *not loaned*, and that cash has been received in exchange for commodities, which these depositors, or others for them, have sold for cash, not borrowed. This use by the banks is a use in excess of the use which could have been made had there been no deposits as for the most part, in the case of France. The right to complete barter by doing the last half of it in buying, before the first half has been done by selling, is the loan of a right which does not, under my theory of money, as an arithmetical intermediary, economically, that is to say geometrically, exist; and hence it may be clumsily called a loan of a credit, or of a right, more correctly, upon the faith and expectation that the commodities geometrically lost and consumed by the extra buying will be geometrically compensated by new and additional things produced, which otherwise would not have been produced at all. The original geometrical loss is thus complemented by geometrical compensation for the loss, as far as mere quantity abstractly considered is concerned, one balancing the other; but it destroys harmony between demand and supply everywhere, although the geometrical total may be *the same* in numbers of measures and weights, because they are not duly related by relative demand. This is the credit banks loan, as it is the only credit in which they may be truly said to deal, and the result, as stated in rigorously exact terms of analysis, is, that the banks have loaned a right which they did not economically possess, and have guarantied depositors against loss thereby, with their capital; while the producers, who have borrowed the right, have guarantied the banks against loss through their capital and the products they *expect to produce* by aid of the loans. Therefore, until the science of common sense becomes also the science of fact, it is useless to discuss the question of mono-metalism and bi-metalism in a congress. *There are other matters to discuss* of vastly more immediate importance than these, but, meantime, the sagacity and practical knowledge of bankers and merchants, and, in many respects, economically sound views of scientific men (as sound as they can be under the illusions of the monetary sphinx), ought to be followed. Why should such a commercial country as the United States persist in coining silver at 16, instead of 15½, and, still more, why should it coin beyond the point of enough? If the coinage continues long enough it will lose all its gold, to the loss of those who have debts to pay where gold is in use, unless, fortunately (as will probably be the fact), its rate of coinage be so slow that silver will be back to 15½ before that time, when, unfortunately in a minor sense, it will lose all its silver. Mono-metalism would inflict such spoliation that either mono-metalism or international trade must give way if it were a *real*, and not an illusory, fact that silver has fallen *as a commodity* in commodities at large, *anywhere* in the world.

Silver has not fallen in commodities even in England any more than the metallic checks of railroad luggage in the United States have fallen in luggage. Silver is at 15½, instead of 18, for British goods anywhere and everywhere, if the corporation of the place allows silver tokens, coined freely at that geometrical ratio, to be used in completing the last half of barter. The actual spoliation which results through mono-metalism is small compared with the total which must exist even under universal bi-metalism, through a false theory of money, and, more or less, must exist as a necessary, because unavoidable, evil, under any theory; but any and all the spoliation possible is as nothing by the absolute necessity of money. A true science, founded on fact, would, nevertheless, confer a great benefit upon mankind, if a knowledge of it were generally diffused and could be generally acted upon.

SUMMARY.

The sum of the matter from a common-sense, a mathematical, and a metaphysical point of view is that we are still in the Ptolemaic stage, so to speak, of the science of money; but the illusory facts are so potent in their influence that it may be a long time before the actual facts will be perceived. There ought not to be *such a chaos* of opinion upon the subject, if there were *really* any true science. But, until a true science can be established, the opinions of those whose authority is most generally recognized, and who are at the same time the most logical in their reasoning from a false theory, ought to prevail, unless *manifestly* in opposition to what is possible. Mr. Price is an able reasoner; but it would be utterly impossible to carry out his ideas about banking reserve. The reserve could never be maintained at so low a point, and be in reality what is falsely called a reserve. On that point the opinion of leading and conservative bankers ought to be followed, and the practical safeguard always kept in view that there can be no danger of keeping too much reserve, and that sound and able managers *cannot, through their own reserves* alone, *maintain themselves and others safe from a severe reaction*, because the mathematical law of limitation must be applied scientifically to all banks (which, perhaps, will never be practically possible), in order to produce that effect. The true practical direction of reform, therefore, is not in the direction indicated by Mr. Price, but exactly in the opposite direction. No man who has written upon the subject of money has stated with greater force many of the real facts about money; but he is so severely logical that he arrives at a conclusion in direct opposition to that of Adam Smith, who maintained that the "volume" of bank notes ought to be limited by metal of the same "volume" retired. Mr. Price is probably carried to his logical conclusion, that enough to keep is what is called for, with a small margin beside, by the prevailing idea that *gold money is a commodity.* That conclusion might be correct if it were really a commodity, and not what it actually is, and would seem to be, if the illusion would pass off, — a mode of consuming or using a commodity only; but if it is a commodity to be consumed by individuals, instead of individuals of a corporation of buyers and sellers, acting for the most part through government, why is it not disposed of in like manner? It seems singular that the following question does not occur to the mind of an able reasoner like Mr. Price: If money is really a commodity, as I call it, why is not my check on a bank an order on a *store-keeper* to deliver so many pounds, ounces, and pennyweights of gold, and why, in aid of monetary science, can I not write Store-keeper instead of Bank or Banker in the check? For if the payee, who is the *buyer* of that gold, and at the same time a seller of goods, prefers to let it remain, he can do so; or he can order a delivery of those pounds, ounces, and pennyweights to some other store-keeper. The absurdity of *such* a check is manifest enough, but how much greater absurdity, if possible, would it be if a drawer were to state in his check that it is not generally known how much gold there is in a dollar, and, therefore, as he could not tell how many pounds he had in deposit, the store-keeper must ascertain for him. Now, to write this in a check is just as logical a conclusion from the premiss, Money is a commodity, as Mr. Price's conclusion that ½ of 1 per cent. and a reasonable margin over is gold enough *to keep in the store.*

Both conclusions are equally logical, and both are *practically* absurd, but *their irony* is itself an argument which would seem to be enough to surprise a man at first, and then to set him thinking whether there might not be some illusion about the premiss. He might continue to think *indefinitely,* but he would never think to any satisfactory purpose, until he at last perceived that he had all the time been confounding the use or consumption of a commodity with the commodity itself; and that even an imperial corporation could not prohibit the corporators from buying, selling, or bartering silver or gold, if they chose, nor could the corporation prohibit the use of gold and silver by members for private uses, but only for corporate uses. If a man thinks *thus far,* it would seem that the eyes of his intellectual man ought to convince him that the premiss is only putting into language the illusion as it appeared at first, and may continue to appear unless and until the moral man, behind the intellectual man, has will power enough to keep the intellectual man steady in seeing actual phenomena. If money is really bartered when it is paid for goods; if an ounce of gold, as money, is either bought or sold, when, to use the language of fact *only*, it buys anything for a holder, then it is impossible for the corporation to keep the corporators from *bartering* either gold or silver, *or both* if they choose, *for goods:* the members have a right to barter the silver *directly* for the goods if *they can.* If barter of silver for goods be what was *really going on* in Germany before silver fell, the act of the imperial government never stopped it, and it is going on to-day. The eyes of the man of common sense, in the ablest writers upon money, have certainly been deceived by the illusion that money is a commodity, and thus we are still in the Ptolemaic stage. One theory only dispels the illusion, and that is, not the practical Ptolemaic theory of common sense founded on illusory fact, but the theory of right reason founded upon actual facts. Mutual needs bring men together like beavers and bees, but it brings them together only as far as those needs call. If their needs commanded them to go into hives like bees, they would go, but they *do not go into hives*, because their needs require the *exact opposite:* their needs require them to go into communities or corporations *for certain purposes*, and the great purpose is trade. But if they trade, *they must have money*, and what that is, and what it means, *is really a metaphysical question*, which can be answered *only after the most searching analysis*, and the analysis includes within its scope, *for the most part*, mental or *metaphysical facts*, which are difficult of discovery. If, *when* a man discovers that 2 ounces of gold are worth twice as much as 1 ounce, and that he obtains certain valuable commodities for 1 ounce of gold, and *twice* as many commodities with *2 ounces*, he is told that this is not barter, but that if he offers commodities for commodities, and makes the exchange, this *is barter*, he is certainly very much surprised if no reason is given, and he looks upon the assertion as absurd; but if the corporation cannot forbid the second barter, and yet can and do successfully forbid the first, the eyes of the intellectual man ought to be sharpened, to discover whether there is not some fallacy about the gold that his intellectual eyes have not hitherto brought to his notice. Because the needs of the individual man compel him to act corporately in reference to money, he acts corporately, and because his needs require him to act exactly in the opposite direction about the goods his money buys, he acts in the opposite direction about the goods. *The corporation must* determine about the money, *and he must* determine about the goods. The money is means to the goods, and therefore no part of the goods, and if the corporation take in hand, not only to decide what the money shall be, but to give it a geometrical construction, and an image and superscription, over and above a geometrical apportionment of weight, he is relieved of the *necessity*, for the most part, of *knowing* the weight, and *therefore* he forgets it, if he ever knew it, and generally is entirely *ignorant of the weight when he "barters" it.* But he knows the weight of the goods, if they go by weight, for otherwise he could not barter them, but he does not know the weight of the money, and yet it is said he "barters" it. But he cannot barter without this knowledge: therefore the money weight *is but an abstract idea,* and the idea can only be 1 dollar, 2 dollars, 1 pound, 2 pounds, or whatever he pays, *just as it is written out on a bank note or on a bank book.* It is the bartering unit I, whatever the weight may be, and weight shows only the *efficiency* of I on the abstract or money side of the equation of exchange, through its coefficiency as weight, by the aid of its geometrical apportionment, in determining the buying power; the proportional bartering power, and the dividend power, of 1, which carries the gold or silver anywhere in the world. Hence the necessity of mono-metalism, or *one* metal *at least* in the world; and hence, also, if there are two metals, the necessity of what is called bi-metalism, or making the units which carry yellow metal and the units which carry white metal *interconvertible throughout the world,* as soon as the Ptolemaic stage of monetary science gives way to the Copernican. Hence, also, we see collaterally demonstrated *here* what any man can demonstrate to himself *a priori*, that a general medium of exchange between geometrical quantities can by no possibility be any other than a series of units, relating them (the geometricals) one to the other by means of equations, proportions, dividends, and divisors; the sum of all the proportions on the arithmetical side being found by the addition of all the units in the several proportions stated, and the sum of all the proportions on the geometrical side being the sum of all the geometrical proportions. The arithmetical proportions may by supposition be synthetically added, or analytically subtracted, while the geometrical proportions may be synthetically multiplied or analytically divided; and in like manner the two sides of the equations, and the divisors and dividends. The abstract I, unrelated, is indefinitely great or small, or indefinitely nothing; but related to geometrical quantities wanted by the individual consumer, whether bread, clothing, gold and silver plate, diamonds and precious stones, velvets, or feathers, has value *by* weight, but *not through* weight. Therefore, the *paper* pound, when current, is worth nearly 5 times the *gold* dollar, where current, not *through* the paper, but because its value, in a series which constitutes the divisor, the proportion, or the equation, is nearly 5 times as great as that of the dollar. Hence, also, mathematically and metaphysically, and *therefore practically*, whether it be believed or disbelieved, asserted or denied, the geometrical fall of silver in gold to-day, or of gold in silver to-morrow, has no relation to the rise or fall of gold or silver in the money unit I, which carries gold or silver, *in the minds of buyers and sellers*, and therefore it *has no relation at all;* the bullion in either case having a *dead rise and fall* of its own, *unrelated to human needs or human actions*, save *only* that of the miners who mine for the precious metals, and of those who have occasion to exchange, *not merely* one kind of bullion for another, but *one kind of money for another*, in bullion; the bullion itself being geometrically proportioned in the unit I, under its numerous designations, all over the world, not as a commodity *designed for the consumption of individual corporators*, but *all corporators* of the various corporations of the world. The value of the I, being of metaphysical origin and mathematical character, enforces its value and character, so to speak, in respect to all the values which the individual corporator takes to his own use. Being mathematical, it *acts mathematically*, and carries its gold and silver along with it. If silver is geometrically in excess 16 per cent. in the bullion market, this is so far an indication that the I of silver is "scarcer," *outside of the market*, where it is being used in buying to indicate the geometrical values of commodities in arithmetical proportions; and prices are *thus lower in silver*, and therefore there is a smaller amount of dead metal silver being carried to pay for goods, and prices are lower. Silver is low in the bullion market, and *therefore* high in the goods market. But if it is bi-metallically interchangeable with gold all over the world, this inverse habit, which it has mathematically put on, is conventionally taken off by the corporations unitedly saying, Let it be taken off. Until those words are conventionally recorded, the profit of carrying dead silver weight out of the bullion market into money (as at this time) is comparatively small, and the movement slow, and bills of exchange must either pay or take toll, according to the side the drawers stand on; and the bills are the medium through which the toll is paid. This toll is not paid on account of any dead fall or rise of silver or gold in goods, but on account of the profit which the man makes who sells goods for the money whose metal, carried and paid as money, has indirectly made a dead rise in the goods it buys, exactly equal to the dead fall in quantity (weight) of the same amount of metal in the bullion markets of the world. If Mars must be exchanged for Mercury, there is a geometrical fall of Mars in Mercury, and a geometrical rise of Mercury in Mars, and the arithmetical expression of the geometrical facts are fall and rise. If there is a profit to anybody on the rise, it is inversely equal to the loss to somebody else on the fall, if an exchange of any part of Mercury for Mars is made: the whole is neither greater nor less than all its parts, and the fall of the whole is followed by the fall of each of its parts.

If silver is not money in England by weight, whether coined on the one hand, or not coined on the other hand, then it is not money there, and the only question is, What is the dead weight of silver worth to buy with where that dead weight is money? The question is not, What is it worth *to sell* as a commodity,—for, although one might say he could sell it, he would be on a fool's errand without knowing it, were he to undertake it,—but, What is it worth to buy with where it is money? That is the *real* question, while the illusory question always asked, but never answered, is, What is it worth to sell? The rise and fall of silver and gold are abstractions to all save those who have goods to buy or to make. Whoever wants to buy silver or gold plate must buy it with money which had previously bought goods, or services, or labor, and the cost of the latter two is resolvable into goods. The real question to be answered, then, in all cases by consumers of both gold and silver plate as one body is, What is the cost of the plate in goods? and not, What is the cost of silver plate in gold plate, gold plate in silver plate, or gold and silver in each other? If $\frac{3}{4}$ of all the gold and silver of the world had been piled up at Rome before Cæsar's time, gold and silver plate ought to have been "cheap" at Rome, but dear in other parts of the world, while gold and silver in bullion must have been the same where there was free commerce, thus making gold and silver plate and "money" cheap at Rome, and gold and silver plate and money dear elsewhere. Phenomena are the same now, because laws controlling phenomena are the same. The value of gold is conventional, and the value of silver is conventional, and the fact is that there are divers and sundry conventions instead of one; and of these conventions, some are more intelligent and advanced than others, but all are alike in the Ptolemaic stage of knowledge, and the most intelligent are as obstinate in their belief that the Ptolemaic theory is the true one as are the least intelligent. The conventional value of the two metals is not the metals themselves; it is not the geometrical fall of Mars in Mercury; not the fall of that mass of silver which happens to be in the bullion market, for that mass of gold which happens to be in the bullion market, or the contrary, but all the commodities which the gold and silver can buy; and if they are all the money there is in the world, and commodities and money are evenly divided, the gold and silver, if the only money of the world, are worth all the commodities on hand for sale; and the commodities, through gold and silver, are thus, as some "practical" men know them, to be, after a fashion, the *real* circulating capital of the world. What the metals may be worth in the market in each other is material only to plate buyers, so far as they prefer one kind of plate to the other, to brokers and bankers, who are looking after a money profit, and the comparatively small number of people who are forced to send money to pay debts where their own money is not current. What 's Hecuba to the player, or he to Hecuba? What 's silver to the payor, or he to silver, if he does not know how much he is to pay? There is a geometrical value of silver in gold, and of gold in silver; but it is all arithmetical value to his intellectual man, all dollars, sycee, rupees, pounds, francs, marks, *et preterea nihil.* Therefore, instead of sending his gold money as dead gold to rise as dead gold in dead silver, he docks the silver bill of exchange arithmetically with his units of gold, or docks the units of silver arithmetically offered for his gold bill. He has the Ptolemaic idea of a geometrical fall of the vast mass of silver money all over the world (although his intellectual man cannot see it) because there is a geometrical fall of the small quantity of silver in bullion, which the eyes of his corporeal man can see. He is thus carried away captive by the false analogy that because the geometrical rise of copper relative to platinum is attended by more or less rise in value, not only of platinum, but of all other geometrical quantities for sale everywhere in copper, *therefore* the same must be true of silver and gold; whereas it is exactly the reverse, because the more silver or gold there is out of the bullion market, the more there is in the hands of buyers to buy with, and the less there is out of the market, the less there is in their hands to buy with. If buyers had only 1 metallic dollar where they now have 10, because $\frac{9}{10}$ of all the gold and silver now distributed throughout the world in the hands of buyers and sellers had been forcibly taken out of their hands and piled up in the bullion market of London, gold and silver, banking and paper money aside, would "*rise*" in value as dead weight 1000 per cent. each in the hands of buyers, if the cause continued in operation, but would remain stationary in bullion if equal quantities of each were piled up. The 100 in the hands of buyers as a whole would be worth as much as the 1000 had been worth before, because each total is worth all the commodities, and *no more;* and if it were possible to recoin the 100 back into 1000 by reducing weight inversely, so as to bring back the grand series, the grand divisor, and the sum of all the proportions to, and keep them steady at, the old arithmetical 1000, the great "rise" of silver and gold outside of bullion would be broken, as inversely the fall of both might (potentially) have been broken by arithmetically reducing the series, the divisor, and the sum of the proportions with more gold or silver to each unit in due geometrical proportion, thus inversely breaking the fall of both in the sixteenth and seventeenth centuries. The "value" of both gold and silver is the *mathematical expression of the geometrical value in exchange of commodities*, and this expression *can be mathematically* made in $\frac{1}{10}$ of the present mass of gold and silver, just as well as in the $\frac{10}{10}$ now in the hands of buyers and sellers. Mathematically the problem is thus solved, but *practically* it is insolvable, because the $\frac{9}{10}$ could not be carried into individual use or consumption. It would be utterly impossible to carry it there as long as conventional (mathematical) value is equal to actual value of all other commodities. The conventional value, although conventional *merely*, is, in the character of a service, absolutely invaluable, but the *service cannot be rendered* unless the *conventional value continues*, and as long as it continues *all* gold must be money, coined or uncoined, and *all* silver must be money, coined or uncoined; and so long as both continue to be money, whether in bars, ingots, or stamped cylinders having an image and superscription, so long will it be out of the power of buyers and sellers to consume what buyers and sellers would willingly part with, if they could do so without *creating* a fall of the conventional value of silver and gold, which would do more harm than the retirement of metal could do good, even granting that such a retirement is possible. But such a retirement is impossible, because the first condition is that all gold and silver are potentially money, coined or uncoined; *per contra*, the second condition is, that before being *used* as money they must at this stage of the world be coined although the corporations having the metal in possession in their mints *could* retire $\frac{8}{10}$ of the metal into state deposit at every coinage, and coin the remainder. But this course would not only incur the danger of fraudulent use of the retired metal, but also an enormous *contraction* of silver and gold in plate, and recoinage of *all old coins* for the benefit of holders. *These* are the reasons why it is practically impossible to reduce weight either in silver or gold, although it would be *very desirable* to do it, in silver especially; and *not because* there is any *real* value, or, in other words, "intrinsic value" in what *per se* has none, because as mere weight it is an embarrassment of riches in excess of what men need for mathematical use.

Weight is the carrier of "intrinsic value" and not intrinsic value itself, its own intrinsic value being necessarily and unavoidably waived intellectually by the members of the corporation individually, in order to enable the corporation to make it the carrier instead of the possessor of "intrinsic value." The *mental struggle* of ages has been, in forms innumerable, to *grasp conventional value*, under the illusion that it is either the intrinsic value which has actually been waived, or, in some mysterious manner, intrinsic + conventional value, as Prometheus grasped fire from heaven before he was chained to the rock of his own invention. But what is the practical + common-sense view to be taken of the whole subject? To let the Ptolemaic theory continue, as it undoubtedly will, until the Copernican takes its place. Meantime, why should the United States continue to coin silver at 16, instead of 15½, and that, too, indefinitely? It is against common sense to load people down with silver when they would be glad to be relieved of it, as *undoubtedly is the case*, whatever mono-metallic or bi-metallic theories they may have. Silver is, in point *of fact*, uncurrent money outside of mono-silver countries, but in a *full token sense only*, it should be always remembered. It is conventionally money in a subordinate sense to a considerable extent in all countries, and in France and some other mono-gold countries, to a very great extent; but it is conventionally money in a general sense in silver countries only, because in those countries only is *weight without coinage made a full,* *perfect, and complete token of right and coefficient of the unit I,* in finding its due place in any and every monetary series, divisor, or proportion in those countries.

The monetary status of the world is now monometallic. It is called a gold standard for gold countries, and a silver standard for silver countries. In the sense that gold alone is current money in gold countries and silver alone current money in silver countries, it has a meaning founded on fact, but in the sense that either gold or silver money is an *ounce* or *pound standard of value*, to measure the values of commodities on either side of it, it is one phase of the illusion that money is a commodity. It is hardly necessary to repeat — what I have said before — that it is impossible to measure (to speak accurately, to relate) geometrical values which means geometrical quantities, possessing various degrees and kinds of utility, and which goes inaccurately by the name of intrinsic value in other than general terms; and those general terms *are the mathematical language* in which the relation is expressed. If a man who reads *here* believes otherwise, I advise him to try to *think geometrically*, when he is expressing *the relations* of geometrical quantities, from a needle to an anchor, a diamond to a block of granite or marble, while still a commodity outside of a building, or from an ostrich feather to a ton of copper, or a feather-bed. If he clings to the idea that he can do it, whether he actually does it or not, let him ask himself how he can understand that he is measuring the intrinsic values of commodities (which, in accurate language, means geometrical quantities possessing various degrees of utility, which makes them worth exchanging, and therefore causes them to be exchanged) by a commodity gold, the quantity of which in his hand as a buyer he does not know, and the seller who receives it does not know. I have seen it stated in books on money, that a certain quantity of copper is worth a certain quantity of gold, a certain quantity of silver, and a certain quantity of some other metal; thus *relating, or rather attempting to relate, the metals geometrically* as *equivalents* in exchange, but this is only another phase of the illusion that money is a commodity, and the illusion is here very strong. The comparison is made *through the weights of gold and silver coins*, and overlooks the fact that copper, iron, platinum, tin, lead, etc., have *weight only to be considered*, while metallic money has not *weight only* but *fixation of weight* as *a carrier of an abstract term*, and also ignores the metaphysical fact that 1 ton of silver is not only just as good, but a great deal better, as a mass *out of which to construct the carriers than 10 tons*, the whole of which is *dead weight.*

The holder of money, for the most part, knows as little of weight as the player of Hecuba, and dead weight, one pound of which is better than ten pounds, *is no standard* of what a man values; it can only be a medium. The development of money has naturally led to the use of coin without hand ling it, through the aid of banks, and to paper money. In paper money we have the *unbodied unit* expressed mathematically, and carried by paper, and in bank-credit money the unbodied unit written on books, while books and checks are the carriers of the gold or silver tokens or paper tokens in deposit from buyers to sellers, instead of human hands, if no gold, silver, or paper be taken out. Paper money has been *developed naturally* from gold and silver money, through the promise to pay on demand (and even without it), and the payment is *occasionally* made by actual deliveries, but mere promises of this kind are not sufficient, under banking and checks, *to draw the dead metal from reserves*, and keep the paper *arithmetically limited at a fixed point*, or nearly so, *as in Adam Smith's time*, because the great convenience of not handling dead metal, in a highly commercial community, has *destroyed limitation*, and suggested to the practical men who framed the last Bank Act in England the necessity of limitation as well as convertibility. This was a *practical* idea which suggested itself to *practical* men under the name of bringing the variation of paper money to that of a variation in gold. The idea was, that it was a *geometrical variation in a commodity called gold*, which they were getting, and they overlooked the real fact that the objective or standard point to be sought, and which they were *really looking for without knowing it*, when they only went part way towards it, was not the geometrical variation of gold as a commodity, *but the variation* *of the abstract unit of purchasing power*, which was varying without any regulation in bank-credits, so called, and had thereby also nearly *annihilated the regulation*, which existed *naturally* in Adam Smith's time under a different kind of "credits." But it is useless to argue in favor of any change in this regard. Banking, paper money, and mono-metalism, *ought to be, as they will be*, left to go on as heretofore until we are beyond the Ptolemaic stage. If the United States and other countries combine in sufficient force to make silver a *little less than sufficient* to maintain a metallic series *by itself* in the countries embraced by the combination, they may, *all together*, keep gold enough to hold up the bimetallic chain, and if they do they will help the commerce of Great Britain as much as their own, and save tax-payers in India 16 per cent. of their present taxes. The United States may also be advantageously checked in the present coinage of silver at 16 instead of 15½, and saved the risk of being compelled to allow dockage of silver money when they exchange it for gold money to pay holders of their debt abroad, unless they avoid it by increasing the silver in the coins they pay to creditors every time silver falls, or do what would be *more convenient*, remit silver bars as bullion and exchange them for gold abroad, *submitting to the necessary loss*. But a better way would be to follow the lead of the nation with which the largest commercial dealings are had, and stick to gold for the present, *on account of the uncertainty of the result of* *combined action as now limited.* This is the *common sense* of the subject, provided always that the coinage at 16 is not only stopped, but the present outstanding silver coined at 16 recalled and melted; a new coinage at 15½, redeemable always in gold, taking its place. This is the best course, because attended with the *least inconvenience* to the people and the least danger to the credit of the government, while it at the same time lightens the load of silver.

In due time the Ptolemaic theory of the day, which is the theory of common sense and of scientific men, will give way to a theory of fact, and man, the creator of money, will no longer be Prometheus bound to the rock of his own creation, but Prometheus standing upon the rock of his own invention, and the poetry of fiction will, in that sense, be the poetry of fact.

TO THE CRITICS OF THIS BOOK.

VARIOUS criticisms have appeared in the journals to which copies of the first edition were sent. They are entitled to the most respectful consideration, and in this, the second edition, I offer the following reply. Any one who is willing to read or even to run over such a book intelligently, is entitled to the thanks of the author. The status of monetary science, in this last quarter of the nineteenth century, may be briefly stated thus: The orthodox economists, so called by some, affirm that there is no real money in the world but that which is a commodity intrinsically worth the commodities it buys; that buying and selling are only different terms for bartering, or, in other words, buying is bartering on the buyer's side and selling is bartering on the seller's side. The orthodox economists also affirm that if gold and silver are freely coined in such proportions in the mints of any country as to make a certain number of dollars out of 15½ pounds of silver, and 15½ times as many out of 15½ pounds of gold, this is an abortive attempt to fix a commodity ratio between two metallic commodities, gold and silver; for when silver or gold falls, as silver for instance actually has fallen enormously within a few years past everywhere below this ratio as a commodity bartered for gold in the bullion market, it falls equally as a commodity in the shape of a metallic mass called a silver dollar coined at 16, in barter for bread, beef, and commodities in general. But the present silver dollar buys *in point of fact* as much as a gold dollar, and yet according to the orthodox economists this does not contradict the proposition that the silver dollar coined at 16 instead of 15½ has fallen (say 13 per cent.) as a mass of silver in bread, beef, and other commodities, *because*, say the orthodox economists, the American silver dollar coined at 16 is intrinsically worth 3 per cent. more than it would be if coined at 15½, inasmuch as it contains 3 per cent. more metal; and hence the American silver dollar barters as a commodity when it buys bread, etc., at, say 87 cents net intrinsic value and 13 cents token value. In other words it barters as a commodity for 87 cents, and buys as a token for 13 cents. If this be true, it follows that everybody who pays out an American silver dollar for bread, whether man or woman, adult or child, must go through the complex mental operation of bartering a geometrically shaped piece of silver as a commodity and buying with it as a token at one and the same time, in exchange for bread. The orthodox economists further affirm as their last grand abstraction about money, that a bank deals in credits almost entirely, because only about ½ of 1 per cent. of payments is in actual commodity (gold and silver) passed over the bank counter or weighed and delivered out of vaults or cellars. There can be no valid objection to this reasoning, if money is a commodity, and buying and selling are in reality bartering. But the last grand logical and consistent inference from this premiss — that money is a bartered commodity and that a bank deals mostly in credits — is drawn by that able and orthodox economist, Ponamy Price, Professor of Political Economy in the University of Oxford. He is not only a very able economist, but a very logical one; and honestly believing, as he does, that a scientific theory ought to be in harmony with the phenomena of which it professes to be the sum, he declares that the writers of money articles in the London newspapers, and the merchants and bankers who lay great stress upon the export and import of gold, are still under the control of the old mercantile theory or system which Adam Smith exploded long ago, because they think that the movement of the commodity gold by way of export and import is a matter of some importance, whereas in point of fact it is of no importance, in his opinion, inasmuch as a bank deals to the extent of 99½ per cent. in credits and ½ of 1 per cent. in gold. Therefore he concludes that the average amount called for, say ½ of 1 per cent., and a reasonable margin over, is gold enough to keep in banks, because it supplies the demand for gold. In short, he thinks it would be as reasonable for a tradesman, say a hatter, to keep a supply of hats in excess of the demand, as it is for a banker to keep a large supply of gold in excess of demand; the demand for gold being considered by this most logical and orthodox of the orthodox economists, to be a demand by those who want the gold to barter as a commodity in retail or international trade. No other orthodox economist controverts Mr. Price's reasoning, and all probably agree with him; but, whether they agree with him or not, they might with as reasonable a hope of success controvert a geometrical demonstration of Euclid, as to deny his conclusion that ½ of 1 per cent. in gold and a reasonable margin over to meet ordinary contingencies (say 1½ per cent. in all) is enough for banks in general to keep as a reserve, if his and their premiss, that gold and silver money are bartered as commodities when they are used to buy commodities, and the same commodities are sold to the men who buy, be true. Whether the gold and silver could really be "sold off" by bankers so as to bring their total reserve down to 1½ per cent., and whether Mr. Price has, without intending or knowing it, demonstrated by a *reductio ad absurdum* that money is not a bartered commodity, but only a commodity used in bartering other commodities, is a question which common sense in practical bankers raises here at once, but it is not a question I shall discuss here, as it will be discussed in its proper order briefly in another place. I refer to its absurdity here, in order to arouse the reader's attention to the subject of money, intricate and difficult as it is. These I take to be the leading ideas of the orthodox economists, so called, about money. The first question is: are the orthodox economists actually right or only apparently right in their grand premiss, Money (gold and silver) is a commodity, bartered as a commodity in buying and selling? Is it bartered for bread, when it buys it — the word Buy as related to money, being here equivalent to the words Bartered For, and the word Sell as applied to the word Commodity, being also equivalent to Bartered For? I answer that the orthodox economists are entirely right in saying that gold money and silver money are commodities, speaking in a general sense (because their material is a commodity), and entirely wrong in saying that they are bartered for a commodity, say bread, when through human agency they buy bread and bread is at the same time sold for them. But the orthodox theory is not a lame and halting theory: it is not a mere negation, for if it were it would be no theory at all. It is a scientific theory, because it is a positive theory, and not a mere negation of a theory. I have denied its truth, so far only repeating a denial which others have made before me, but they have ended with that denial, affirming no positive theory in place of the one they deny. But the orthodox theory, although thus denied, can have no standing place, unless it is apparently true, or, in other words, has apparent facts to support it. Has it such facts, and, if it has, what are they? It has such facts, I answer, and they are, 1st, the fact that gold and silver, as raw commodities uncoined, and not manufactured into gold and silver plate, watch cases, gold and silver foil, sponge gold, jewelry, etc., and even after they have been coined or manufactured, may be carried to the bullion market, and bartered directly for each other, cost of coinage and manufacture being waived. When so bartered, the price of one, reckoned in the other, rises and falls according to the relative quantities of each in the market. Price, in barter, means the quantity of one commodity which a given quantity of another commodity barters for, and the price of gold reckoned in silver, and that of silver reckoned in gold, are geometrically inverse to the quantities of gold and silver in the market. Thus, as gold rises in quantity in excess of an equal rise in quantity on the part of silver, it is said to fall in value, and the same may be said *per contra* of silver. In other words, the fall of gold in price is the direct result of a geometrical rise of its quantity in pounds, ounces, and pennyweights, as compared with silver in the bullion market *only*, and the rise of gold in price is a geometrical fall of its quantity in pounds, ounces, and pennyweights, as compared with silver in the bullion market *only*, and the same may be said of silver as compared with gold. In still other words, the stated rise and fall of silver and gold is merely an abstract or general expression of the relative rise and fall of the quantities of the metallic commodities gold and silver, in bullion. Whether there are thousands of tons or only hundreds of tons of precious bullion in the market or in circulation out of the market, is not material to the question of bullion price. The two material facts which determine bullion price are, 1st, not how much gold and silver is there in the market? but, how much of the total is gold, and how much of the total is silver? The question of rise and fall of gold and silver depends, therefore, not upon the total quantity in the bullion market, or the total quantity which is being used outside of the market in the process of indirect barter throughout the world, but solely upon the solution of the geometrical question or problem: out of the total quantity in the market, be it much or little, how much of it is gold and how much of it is silver? Gold and silver are bartered for each other as commodities in bullion, and if the ordinary law which governs the value of raw commodities other than gold and silver, applies to gold and silver also, then the orthodox economists are right in maintaining that a rise and fall of gold and silver in each other implies a rise and fall of gold and silver more or less in other commodities, and until and unless the bi-metalists can show or furnish clear and conclusive proof to the contrary, they have no logical standing in a bi-metallic congress. Again, gold and silver are manufactured into metallic commodities for personal use, as are other raw commodities, and why then are not gold and silver, when they are exchanged for commodities, bartered for those commodities and the commodities bartered for them, at the intrinsic value of each?

The orthodox economists have, therefore, a good apparent case, and their theory must and will stand until some one demonstrates that the apparent facts which support the orthodox theory are false and illusory, and that the real facts behind the illusory facts demonstrate the truth of another theory, which must in time supersede the old theory and take its place. To deny the truth of the orthodox theory is a mere negation, and a waste of time and paper: the orthodox theory must be not only denied but it must be disproved, and another theory demonstrated in its place, before any further progress can be made in monetary science. As to the other propositions of the orthodox economists above stated, I remark, that if their barter theory is true, then it is not only a fair inference that bi-metalism is logically absurd, but it is also a fair inference that the American silver dollar is bartered as a commodity at 87 cents, and at the same time paid out as a token for 13 cents. It is an equally fair inference that a bank deals to the extent of about 99½ per cent. of all its transactions in credits, so called, and ½ of 1 per cent. in a metallic commodity which is gold or silver. It is an equally fair inference on the part of that most logical of all the orthodox economists, Mr. Bonamy Price, that because gold money is a commodity which bankers keep for sale as a hatter keeps hats, and because ½ of 1 per cent. is all that is called for, this ½ of 1 per cent. and a reasonable margin, which I will call twice that amount or 1 per cent., making in all 1½ per cent., is enough to keep on hand in the bank, which also might be called a shop, because it supplies the demand; the remaining demand being for bank notes and bank credits. It is useless for any old conservative banker or merchant, or any man who pretends to set up common sense in opposition to such apparently absurd propositions, to say a single word in reply. His common sense, without the aid of searching analysis, tells him, not only that gold and silver are commodities, but that they are bought and sold as commodities; and when the orthodox economists teach him these and other practically absurd inferences, as a part of monetary science, he has no right, logically speaking, to set up his common sense in opposition to the logical inferences from a proposition which his unaided common sense told him was true; viz., that gold and silver money is bartered as a commodity and not merely used as a commodity. Nevertheless, his common sense comes to his aid to some extent in spite of himself, and whether he knows it or not. Suppose an undergraduate at Oxford, in England, or at New Haven, Cambridge, or elsewhere in the United States, is taught political economy in the orthodox fashion, as he must be, if taught at all, and becomes a banker in London, New York, or Boston, and advises his fellow bankers to carry the orthodox monetary science which he has been taught in books and by lectures into practical effect. Suppose he tells them that he has been taught in college that a bank deals in credits 99½ per cent., and commodity ½ of 1 per cent., and therefore ½ of

1 per cent. and a reasonable margin for contingencies, say 1 per cent., making 1½ per cent in all, is reserve enough to keep in the bank, because true money is a commodity kept for sale in a shop, otherwise and more particularly called a bank, and ½ of 1 per cent. supplies the demand for that commodity, the remainder of the demand being for credits and bank notes. Would not his fellow bankers conclude that he was out of his wits? Probably they would, but why should they, if the orthodox theory, which they all admit themselves, as far as they have any theory, be true? Is it not a fact that Mr. Bonamy Price, Professor of Political Economy at Oxford in England, delivered lectures upon monetary subjects a few years since in New York city, — one or more of which were attended by that generous and aged "greenbacker," Peter Cooper, — in which he maintained the same doctrine about bank reserve which he had taught in his lectures (published under the title "Principles of Currency") to the undergraduates of Oxford, the sum of which I have given above? Did not the venerable "greenbacker" take courage at the idea of so near an approach to the solution of the grand problem of getting along without any reserve at all? But why do I single out Professor Price, as maintaining the plan or problem, of making the nearest approach possible to getting along without any reserve at all, and "dealing" only in the airy nothing of "credits"? I single him out, not because the other orthodox economists differ

from him essentially, for we hear the same thing in substance from bankers who have a theory, at the annual meetings of our bankers, and we read it in books and hear it in lectures, but Professor Price, an able and honest logician as well as an able economist, has, by insisting on carrying out the conclusions which follow from the proposition, that metallic money is a commodity kept for sale by bankers, and bartered as a commodity when it buys a commodity, practically demonstrated the falsity of that proposition by reducing it to an absurdity, without knowing it, and has thus rendered great service in helping indirectly to establish a true science of money; for, what can really be more absurd in the light of actual facts and plain common sense, than even to propose to the bankers of London and New York to sell off their gold down to 1½ per cent.? How absurd it is in the light of common sense even to talk about selling off gold and silver money at all, and how utterly impossible it would be to make the sale. Even if a sale were possible, how utterly impossible it would be to carry total reserve down to 1½ per cent., even if the most dangerous kind of banking now in vogue in some banks were universally prevalent. But why impossible? One reason is enough to give, and it is, that the banks would all become bankrupt, and "suspend," before that ratio was, in the downward progress of banking, reached. Even to propose such a reserve is repugnant to the common sense of all bankers: their common sense at once perceives the absurdity of such a proposition. Their common sense serves them a good turn when it tells them that sound banking demands a "good reserve" in all banks in spite of all abstract logical inferences to the contrary, drawn by eminent economists from the abstract and apparently true proposition (apparently true but not really true), that metallic money is bartered for commodities and is therefore kept for sale by bankers. But is there no other proof than a practical *reductio ad absurdum*, that money is not a commodity kept for sale or bartered? I answer that analysis furnishes abundant additional proof. Probably not one buyer or seller in ten thousand knows the weight of the coin he buys with, because under government coinage he need not know it. What, then, does he know, when he buys with money or sells for money? He only knows that he is using one or more tokens called dollars, pounds, francs, etc., to buy goods, and that the goods are valued in dollars, pounds, francs, etc., and their fractions. What he really does, is not something he has no knowledge of, but that which he has the fullest and clearest knowledge of, and that is, that he estimates or values the goods in dollars, etc., and pays the dollars over when the price is agreed on. His knowledge of what he is doing is, not that he is bartering so many pounds, ounces, and pennyweights of gold or silver for commodities, but that he is giving tokens called dollars, etc., whose weight enters not into his mind, for commodities, whose weight does enter into his mind if they go by weight, as gold and silver tokens also would, if they were *bought and sold* as commodities, and not merely *used* as tokens. That eminent economist, M. J. B. Say, placed the evidence he offered as to what money is, precisely in the mental quarter, maintaining that the only mental act or thought was about the weight of metal in the coins paid, and Professor Price maintains that the buyer makes a mental estimate of the cost of the metal paid, and the seller makes an estimate of the cost of the goods, and when the estimate is made on each side the money and the goods change hands. Is this a fact or is it even conceivable that it might be a fact?

Again, is it a fact, or even conceivable as a fact, that the man who pays a silver dollar of our fathers, unwisely coined at 16 instead of 15½ and unwisely left without any limitation by convertibility at will into the gold dollar, takes mental cognizance of the fact that he is bartering a valuable commodity and at the same time paying out a token? Surely it is inconceivable, because the only *actual* conception formed, is that of a mass of metal artistically shaped in the form of a flat cylinder, stamped and named One Dollar, and called a dollar, as a spade is called a spade, and a ring is called a ring. Again, silver has fallen in gold, and now stands at, say 16 per cent. below the ratio of 15½ : 1. This is called a fall of silver. Is it correctly so called? Unquestionably it is. But has silver fallen in purchasing power, or, in other words, in the merchandise it will buy? Surely not, and one of the most orthodox of all orthodox economists, whom I will not name, says it has not. But does he add anything to this assertion? He does, by saying further that silver has fallen in gold, which is equivalent to a fall of silver in merchandise. Is this assertion true? It is true in one sense, and illusory, and therefore false, in another sense. It is true because if a man sells goods for as much silver by weight, in foreign coin, as will make by weight one hundred silver dollars, in the United States, and the foreign coin he receives is the average price for such a lot of goods, and he then takes the silver coin he receives to the United States, it is merely a raw commodity there, and in order to convert it into money he must barter it for gold as a raw commodity at a loss of, say 16 per cent.; but when he gets the raw commodity gold for his raw commodity silver, his raw gold is at the same time gold coin, a bar of gold exchangeable for gold coin, or its equivalent, paper convertible into coin. Thus far, but no farther, is the fall of silver as a raw commodity, in gold as a raw commodity, equivalent to the fall of silver in the commodities of silver countries. I say thus far but no farther, because if silver and gold are commodities kept for sale by bankers, and if they are *bartered as commodities* in exchange for commodities in general, instead of being *used as commodities only*, in the character of tokens, in order to effect the exchange of all commodities other than themselves, both raw and manufactured (the exception being themselves when in the manufactured state, for private use, or, in other words, for all uses save that of tokens) ; if, I say, such be the fact, then, because a commodity other than silver or gold, when it falls in one commodity must necessarily fall in all other commodities, it follows at once, that if a piece of gold in the shape of either a coin or a bar rises 16 per cent. in silver, or, what is the same thing or its complement, if a piece of silver in the shape of a coin or a bar falls 16 per cent. in gold, then gold must have risen in all the commodities of the world in the first case, and silver must have fallen in all of them, gold included, in the second case. Because neither of these propositions is true, it follows that the only possible solution of the problem in a way which the human intellect can comprehend, is, that the common sense of mankind is entirely right in calling some kinds of money token money and entirely at fault in excluding gold and silver under any circumstances from the category or series of token, and putting it under that of barter at intrinsic value. There can be no question that gold and silver are metallic commodities intrinsically very valuable as commodities independently of their token value whether in the shape of a bar or a coin; the illusory fact is that what is in reality a token is bartered at the " intrinsic value " of its metal, and, as before stated, it is sustained by a number of apparent facts. The use of a valuable commodity like gold or silver as a token by weight to buy commodities is mentally confounded with a barter of that commodity at its "intrinsic value." This mental confounding of use of a commodity gold or silver with barter of a commodity gold or silver is supported by, and probably partly founded on, the actual fact that large quantities of gold and silver are manufactured into commodities for uses other than, that of money, at their token value as far as raw material is concerned. In other words, a jeweler who manufactures a pound of gold into commodities for sale uses money itself, or, in still other words, a commodity weighing one pound, which is at the same time a series of tokens which weigh one pound. The "intrinsic value" which he carries as raw material into those commodities is not only the commodity one pound of gold, but it is also the number of standard tokens, say dollars, the pound of gold can furnish out of that weight. The *real* question then is: What are those tokens worth? They are worth what they will buy in commodities. But what will they buy in commodities? The answer to this simple question is, that being tokens, they are by necessity distributed all over the world in the hands of buyers and sellers, and to give a perfect answer to the question, we must inquire not, What is this series of tokens distributed all over the world, under the title of units called, Dollars, Pounds, etc., for the purpose of carrying on *indirect* barter, worth in *direct* barter for commodities? but, What is the number of tokens considered as units under various names in the series, taken as a whole; what is the total quantity of commodities to be bartered indirectly by their aid; how do the minor totals of each commodity for sale, as a whole, stand towards each other in respect to demand and supply; how many of the tokens have been taken by the hand of war or violence by way of fine, tribute, or tax, from one country to another; how many have been lent by banks and paid out as tokens in excess of all the payments and loans which would have been made without banks; and how many paper tokens have been lent and kept in use in excess of the metallic tokens which they have retired? This is the complex question, too complex for any mortal man to answer in terms, although it is in effect answered *as a whole* with rigorous exactness by the whole corporate body of buyers and sellers. It is a very easy but altogether a perfunctory answer, to say that the tokens called Dollars, Pounds, etc., rise and fall as commodities in purchases and sales, but it is an answer which is contradicted by facts. There is perfectly free trade in gold and silver as raw commodities, but the trade in gold and silver, manufactured commodities, is more or less restricted or "protected." What is the cause? The cause lies in the fact that the raw commodities gold and silver are in effect money, or, in other words, tokens, because they can be exchanged for tokens at all times, at little or no expense, and being tokens of the commercial world, the commercial world is virtually one country for their use; and because this is the fact, it is impossible to impose a duty upon their raw material, which is in reality a series of tokens itself. But a duty can be imposed upon manufactured goods, the raw material of which is gold or silver, because they are not tokens of the commercial world, and their metal is worth by weight much more, reckoned in commodities at large, than it can buy as tokens, of commodities at large. Gold and silver therefore appear in three productive and commercial relations: 1st, that of raw commodities in bullion, quantity in market on one side being always worth quantity in market on the other side; 2d, that of tokens by weight in the shape for the most part of geometrically constructed cylinders duly stamped and superscribed by government, the purchasing power of the token being determined not by the mere geometrical rise or fall in quantity respectively, of gold and silver in bullion, but upon the complex elements above mentioned, some or all of which may be called mathematical; 3d, that of goods manufactured for private use.

Germany has abolished the use of silver tokens, except for minor use, and substituted the use of gold tokens. Has it abolished the trade in the raw commodities, gold and silver? Surely not, for that is a free trade going on all over the world, and the two raw commodities, silver and gold, stand at the same *commodity* ratio all over the world. It could no more abolish this trade than it could abolish any other trade. Has Germany abolished the manufacture of and trade in gold and silver manufactured commodities? Surely not, for that would be beyond its power. Has it abolished the private consumption, or, in other words, use of gold and silver manufactured goods? Surely not, for that belongs to every private consumer to decide for himself. What then has Germany abolished, and what has it created in its place? It has abolished the free function of silver as a token in Germany, allowing the free trade by way of barter of gold and silver as raw commodities for each other, and the manufacture and sale of gold and silver goods for private use, and the private use following such manufacture and sale, to go on, having no intent and no power to stop them. It has abolished the token function of silver by simply closing its mints to the free coinage of silver, and it has created a token function of gold in its place by opening its mints to gold: it has withdrawn a large portion of the silver tokens by giving gold tokens in exchange. The rise and fall of a gold or silver token in purchasing power is a very different affair from the rise or fall of its metal as a raw commodity in bullion; buyers and sellers are not bartering gold and silver tokens, or, to speak with rigorous exactness, the functions of those tokens at the intrinsic value of their metal, any more than they are bartering the functions of paper tokens at their intrinsic value. Buyers and sellers are not doing anything of that kind, but they are bartering goods indirectly to and with each other, by the aid of geometrically constructed metallic tokens, having their weight fixed, not by a commodity ratio but by a mathematical (geometrical) ratio. What makes the token a perfect one is *free* coinage at that mathematical ratio; what makes it an imperfect token is refusal to coin at all, or a limitation of coinage. The first token is perfect, and the second imperfect, because the metallic money of the world constitutes a series of tokens which is in other words a series of units with a name appended, which is also the name of the token. All the gold and silver must be disposed of, either by coinage or manufacture. Manufacture being free everywhere, coinage ought to be free. To limit the coinage of one metal and coin the other without limitation, disturbs the free distribution of tokens of each kind throughout the world, and therefore limits the purchasing power of each token in excess or defect of the other, inversely to barter value in bullion; making prices relatively high in one metal token and relatively low in the other, in entire opposition to the geometrical ratio at which they are coined. Mono-metalism is therefore logically, as well as actually, absurd, under a theory of money founded on actual facts shown by exhaustive analysis, but *logically* sound under the short and simple theory that a gold or silver coin is bartered at the intrinsic value of its metal.

Tax-payers in India are now paying an extra tax in silver rupees, of, say 16 per cent., in order to exchange their rupees, as raw bullion, for gold, to be paid into the Imperial treasury in London. Is this tax onerous or burdensome, to speak in very general terms? Doubtless it is, but still there is a compensation for it, and the tax affects only a comparatively small part of trade. But why so? Because money is a series of tokens, and trade is for the most part indirect barter, carried on by the aid of these tokens. The value of the token, whether of gold, silver, or paper, is mathematically inverse to the length of its series or that part of its series actually used in buying, and it is mathematically impossible for any monetary spoliation to occur where goods are exported and sold, and the money proceeds reinvested in other goods. But because where, under universal mono-metalism now prevailing, gold is merely a raw commodity and not a token in silver countries, and silver merely a raw commodity and not a token in gold countries, monetary spoliation is now unavoidably inflicted, to the extent of 16 per cent., upon those inhabitants of silver countries who, as tax or tribute payers to the Imperial Government in London, or any other foreign government, cannot, or, as mere debt payers, prefer not to take the chances of a mercantile adventure by buying goods at home with their silver tokens, and sending the goods to the gold country, where they pay tribute, tax, or debt, to be sold there for gold tokens. When the grand redistribution of gold and silver tokens now going on under universal mono-metalism has been completed, gold tokens being diminished and their series shortened in gold countries, while silver tokens will be increased and their series lengthened in silver countries, the raw commodity market of gold and silver will unavoidably change back to the *prevailing* mathematical (geometrical) ratio at which the gold and silver tokens of the world are even now largely coined, which is 15½ : 1, and when this occurs, the market value of silver will be, say 16 per cent. higher than now, while that of gold will be, say 16 per cent. lower than now. If silver then buys as a token 16 per cent. less than now, and gold as a token 16 per cent. more than now, the spoliation will still be 16 per cent., but it will be against gold countries and it will come through goods, and the net debit against gold countries in favor of silver countries will therefore be 32 per cent. more than now, or, in other words, 16 per cent. above the average existing before France and her allies stopped the free coinage of silver, in place of the net debit against silver countries of 16 per cent. now existing through the exchange of gold and silver tokens as raw commodities in bullion.

These are the *true*, practical, common-sense reasons why the United States ought to coin at 15½ instead of 16, making all its silver coin redeemable in gold coin, and *not* because upon a theory of money founded upon actual facts mono-metalism can be logically sustained. There must be some *positive* theory of money, and this must be, *as far as possible*, the working theory. Under a theory of money founded on apparent facts, or facts at first intellectual sight, gold and silver money is a bartered commodity and a commodity kept for sale by bank ers, as Mr. Bonamy Price asserts, although there is something about the expression which, to say the least, is somewhat grotesque, but under a theory of money founded upon actual facts brought to the intellectual sight by analysis, the apparent facts, upon which the only theory of money we have is founded, become illusory and not real facts. A theory founded upon actual facts must prevail some time or other, if the human race continues to progress, but as long as the present theory of money as a bartered commodity, and of a rise and fall of money as a commodity, continues, mono-metalism must by logical necessity prevail, for the most part at least. The true theory, when established, will teach that there can be no such thing as commodity rise or fall in money, because money being a token, the rise and fall is in the purchasing power of the token and not in the metal of which it is made. Eminent economists have all, in one form or another, in describing monetary phenomena, virtually declared that money is a token. Adam Smith says that money is like a bill of exchange payable to bearer, and that it is only useful to procure other commodities. M. J. B. Say says substantially the same thing, and Mr. Bonamy Price says there is no wealth in money, and that it is only a tool procured, for the purpose of procuring other things. What is this but saying in substance that money is used as a token and not bought and sold as a commodity? Are not the words Buy and Sell a standing demonstration that goods are indirectly exchanged by the aid of tokens, and not directly bartered as commodities? Are not the students of political economy told in text-books that single barter is inconvenient, and that the inconvenience led to the introduction of double barter? Does not this conversion of single into double barter look, upon a little reflection, like jumping out of the frying pan into the fire?

I have given to my book the title of The Common Sense, The Mathematics, and The Metaphysics of Money. At the start undoubtedly Common Sense is at fault in supposing, or rather taking it for granted, that money is bartered as a commodity, but when common sense is called upon to act in buying and selling, banking, and all other monetary matters, it *practically treats money as a token.*

A buyer who buys with a silver or gold coin, may, in talking about metallic money, say that the coin has intrinsic value and passes at its intrinsic value, and the writer upon money formulates this idea and its expression into a compact theory; and the inference of *logicians* from *that* theory being, that money being, as respects banks, a bartered commodity, *only when it is actually delivered to drawers of checks or to banks*, the amount of commodity actually delivered being very small a bank deals mostly in "credits," and hence only a very small reserve in excess of say ½ of 1 per cent. is called for. But does or can any banker act upon the idea that a bank deals in an undefined something called Credits? Surely not, for he knows *in-*

stinctively, that his "dealing" consists in receiving, paying, and lending money. If the writers upon money are right, a bank deals in an undefined something, entirely different from money; if the common sense of people at large, and even most bankers, is not at fault, a bank deals, if it deals at all, in nothing but money. If science is not at fault, the movement of the commodity gold into banks in excess of "demand" is useless and extravagant, and without any just influence upon loans; if the common sense of people at large, and of most bankers, is not at fault, the movement of gold not only has, but always ought to have, the most potent influence upon any bank which desires to avoid bankruptcy. If science is right, banks at a clearing centre, inasmuch as they deal mostly in "credits," may either "pool" or put their reserves into common stock, or come as near to it as possible, by lending without limit to each other; if the common sense of people at large, and of most bankers, is not at fault, banking reserve as a whole at a clearing centre ought not to be treated as a common fund, and weak banks thus supported by strong banks, but it should be treated as several funds jointly kept. If science is right, banks dealt altogether in gold, silver, and bank notes before the science of clearing was established, and mostly in credits since; if the common sense of people at large, and of most bankers, is not at fault, if a bank dealt in its reserve before clearing was established, it has continued to deal in it ever since, and clearing only saves handling.

These are some of my reasons for making the first part of the complex title, The Common Sense. I appeal in the first part of the book, under this title, to common sense in action, against common sense undertaking to reason upon apparent facts, without first making an exhaustive analysis which discloses the actual facts masked behind the apparent facts. I have added further to this title, The Mathematics of Money, because money being a token its purchasing power depends more or less upon mathematical laws. The "intrinsic value" of money is not a tangible thing, but the function of a thing which, in the hands of buyers and sellers, may be shells, flat ivory cylinders, cylinders of gold or silver, or pieces of paper. The function, or, in other words, the use, takes place through buyers and sellers, and if there is or can be any intrinsic value in a function it may exist in the function of money, for there is no other place to locate it. Money being a token, it follows that all money, as a whole, is the total series of tokens, which, being tokens, are also *potentially* units in a divisor, of which all commodities are potentially the dividend. The value of the unit, which is also a token, must necessarily be inverse under the abstract designation of dollar's worth of commodities, pound's worth of commodities, etc., to the total number of units in the series used as tokens in buying, and direct to the total of commodities to be bought. There was no real fall in the metal of the gold and silver tokens employed in buying in the sixteenth and seventeenth centuries. If the coin could all have been, from time to time, suddenly carried into the different mints and at once recoined with additional metal, by making the total metal of one token answer for only a fraction of a token, and keeping the whole number in very nearly the same ratio to commodities, there would have been no fall of the token in purchasing power. There was no fall of the metal of a token as a commodity, which in its fall carried its token with it, but there was a fall in the purchasing power of the token, *in consequence* of the vast increase of the number in use, by the large quantities of gold and silver (the material of the tokens) mined in America. I have added further the title, The Metaphysics of Money, because the delusion of intrinsic value in money, of barter of money, keeping money for sale, and confounding buying and selling with barter, is the result of a mental illusion before the intellectual eyes. The illusion is mental in the start, and it is confirmed by confounding the use or function of a commodity gold and a commodity silver with a barter of those commodities for other commodities. Money is said to be a commodity, and, on the other hand, it is said to be not a commodity. Both assertions are illusory, because money is a commodity, but not a bartered commodity in its character of money, as the affirmative expression would imply to most people. It is illusory, on the other hand, to say that money is not a commodity, without qualifying commodity by adding *bartered.*

The illusion being a mental one, I introduce mental or metaphysical facts to demonstrate the fact of illusion. There can be no true science of money until science and facts are in harmony everywhere. As long as mono-metalism, banking, and monetary facts in general, and many productive and commercial facts contradict, in practical life, political economy as now taught, it is a waste of time to study it, except for the purpose of laying bare its fallacies by analysis. It is no fault, however, of political economists: they are trying with all their energies to grapple with economical facts, but their labors are as fruitless as those of Ixion at his wheel, Sisyphus with his huge round stone, or Tantalus trying uselessly to grasp the viands which move from him as his hand approaches them. It is curious to notice the different criticisms of the book. One says it is the right kind of a book and there ought to be more of the same kind, but the author utterly fails in the capacity of reaching the intellect of readers at large. How is it possible, I ask, to accomplish this feat, upon such a subject? Another says, it is extraordinary that a book with such a definition of money was ever published, and still more extraordinary that it was ever written. The critic does not reflect that the definition is in harmony with the theory propounded and claimed to be demonstrated. The definition is as abstract, that is to say as general, as it can possibly be made, as all definitions ought to be. The real question is: Is the truth of the theory demonstrated? If the theory is demonstrated to be true, then the definition is a good one. Another critic says he believes metallic money to be a commodity, and I do not. He is entirely mistaken. I believe metallic money to be a commodity in use, but not a commodity bartered or kept for sale. I believe it to be a token, and I appeal to the mental wish, audibly or inaudibly spoken, of every buyer who carries a load of silver tokens weighing perhaps a pound, whether he would not gladly consent to give up three quarters of the weight he carries, if it were mathematically possible to reduce the tokens to that extent in weight, and keep them at the same purchasing power. Bi-metalism is important, not for the purpose of loading people down with silver, but to put a stop to the monetary spoliation which results from mono-metalism; to give the same purchasing power to the token of each kind throughout the world, and by placing the two metallic series together, to increase the number of units in the resulting joint series, and thus help to steady the purchasing power of every monetary token unit in all places. Until a new science is adopted and taught, it is against common sense to load the people of the United States down with silver. Every European nation ought to carry its share of the load, and when true science is established, the load may perhaps for the most part be dispensed with, by storing silver, using a paper or some other token in its place, and confining the movement of precious metal nationally and internationally, in Europe and the United

States at least, to gold. An apparent bi-metalist, writes me, that to argue in favor of abandoning the further coinage of silver, is a fine piece of nonsense. It is impossible to hit the views of all critics, and my theory must stand or fall by its own merits. In process of time it will be the prevailing theory of money, and when that is the case, and men are educated in that theory, the wonder with some people will be, how any theory of intrinsic value in what is really only a function, use, or process, can ever have prevailed. In using the term Orthodox, in relation to political economists, my object is to use all the means at hand to arouse the attention of those who have devoted their time and talents to studying and teaching political economy to aid me in pointing out and throwing as much light as I can upon the quarter where the contradiction between actual facts and theory originates. It lies, I believe, in the confounding of the function, use, or consumption of a commodity with the barter or sale of it.

Professor Bonamy Price argues, with great ability and force, that gold and silver as money are practically not wealth at all, as did Adam Smith before him, for this is only a solemn affirmation of the poetical *reductio ad absurdum* of the contrary idea in the old fable of king Midas, but when he comes to make a practical application of the truth contained in his words, he falls into the practical mistake of proposing to bankers a reserve which is virtually no reserve at all, and he might with the same propriety recommend to them the abandonment of gold and silver altogether, and the use of a paper reserve after the manner of our "greenbackers." I have not started on the fool's errand of undertaking to prove that money is not a commodity, but I am on the errand of proving that money in general is a token; that perfect gold and silver money is a series of perfect tokens by weight with free coinage, and that they buy as tokens, while metallic money under limited coinage is a series of imperfect tokens; and that all paper money is a series of imperfect tokens. If all the goods in the world were placed in cöoperative storehouses, money by *that name* abandoned, and gold and silver tokens delivered to depositors of goods, and taken also from those who took goods out of deposit, there would be no disputes or doubts about "intrinsic value"; the gold or silver tokens would be consumed in their character of *valuable* but *not valued* commodities in the process of bartering goods. If the individual consumers of gold and silver manufactured commodities did not then carry their consumption of those goods any farther than they do now, there would be the same complaint as now about the inconveniently heavy silver dollar (token), but the superfluous weight of the silver token could no more be got rid of than the superfluous weight of a carriage weighted unduly with material. There could not then, any more than there is now, be such a thing as an excess of silver or gold for private or individual consumers; the more gold and silver in the shape of manufactured commodities for private use, the more wealth, but for token use, the less weight in the token the better, up to the point when it would be inconveniently small in surface and thickness. But because token use would be then as it is now, the principal use of gold and silver, that use would, as it does now, entirely control the use of individual consumers of manufactured commodities; and because the token would then have, as it now has, purchasing power inverse to the number of tokens coined and used, it would be mathematically impossible to get rid of the superfluous weight, even by giving it away to individual consumers. By reason of the mathematical fact of purchasing power being inverse to the length of the series, or, in other words, to the number of units in it, it would be mathematically impossible to maintain the token of the series as a perfect token, by reducing weight, and limitation of coinage would necessary follow any attempt to retire a part of the metal into state deposit, while it would be impossible to give away the superfluous metal to individual consumers, and still keep the unit steady. The only plan of relief would be to retire the metal partly coined and partly uncoined, or even all coined, into deposit, and issue paper tokens for it. The grand object of metallic money is an important end, and that end is steadiness of purchasing power, which is more or less a mathematical question. *Limitation* is the means, and steadiness the end; therefore I have given the second part of the title above stated to my book because money must be regarded under that head, in order to establish my theory. I claim for my theory of money that it is in harmony with all monetary facts, and explains them all, and therefore I conclude that some time or other it will be the prevailing theory. The logical theory, or, in other words, the scientific theory of money now prevailing, leads to the practically absurd conclusion, that because metallic money is kept for sale, and bartered at its intrinsic value, a reserve of 1½ per cent. supplies the demand for the metallic commodity, and hence that amount is sufficient to keep on hand in the shop or store, which goes more particularly by the name of a bank. My theory leads to the sound conclusion sustained by common sense, that because perfect metallic money is not only a commodity, but also a geometrically constructed token, having not merely weight to sell by like other commodities, but a geometrical apportionment of weight and free coinage, or, in other words, free manufacture, and being at the same time not a mere local or national token, but a token of the commercial world, these metallic tokens ought to form as nearly as possible a definite portion of all tokens actually paid or lent, whether actually handled or not; and because the difference between the reserve of a bank and its total deposit is equivalent to so much paper money, and all paper money in excess of the metallic money it retires so many local tokens in excess of the commercial world's tokens, all paper money ought to be limited by metallic money in reserve in a continuous or even ratio, as nearly as possible, and all deposits in excess of reserve kept in the same ratio within short periods to the metallic money in the reserve. The first limitation could be readily carried out by requiring all national banks to place their metallic reserves in a bureau or department of the sub-treasury, releasing the securities for notes now held by the government to the banks, *pro tanto*, thus furnishing several funds jointly kept and requiring a ratio of 20 or 25 per cent. metallic tokens to paper tokens, to be maintained. The second limitation would, perhaps, be practically impossible in any complete or perfect sense, but in process of time might, under the influence of sound science, be much more readily accomplished than now. The present theory of intrinsic value in what is not a commodity, but the function or use of a commodity through human agency, leads logically to mono-metalism, and the effect of mono-metalism is to annihilate the token value of one metal in parts of the commercial world, and to force the uncurrent token into market as a commodity to be bartered. Call one half of the world where the gold token alone is a perfect token under free coinage, A, and the other half where the silver token is the only perfect token, B. Silver is now down 16 per cent. in trade, or, in other words, in bullion. The geometrical ratio of silver is 16 in the United States, 15½ in France, and countries in monetary alliance with her, and in other countries it may be 15. Nevertheless 15½ is the prominent and controlling ratio, and I will assume it to be universal by way of illustration. The geometrical ratio of silver is then 15½, and that of gold 1, or in other words 1 pound of gold is still manufactured into as many tokens as 15½ pounds of silver, *notwithstanding the establishment of mono-metalism under the illusory idea of "Standard."* The immediate result of its establishment is, that although there cannot possibly have occurred as yet any very extensive redistribution of tokens *in point of number*, sufficient to change prices materially, the man who, living in a silver country of B, has debt, tribute, or tax to pay in a gold country of A, has nothing but silver tokens to pay with, and they are not current in the gold country. The final result is, that although the goods he can buy in his own country with 15½ pounds weight of silver tokens would barter at par for the goods his creditor can buy in his gold country, with one pound weight of gold tokens upon the average, his only way of paying directly in money is to barter his silver tokens as bullion for gold, and pay his creditor with gold tokens at a loss of 16 per cent.; gold tokens and silver tokens being not only tokens but commodities also; and, on the other hand, not only commodities, but tokens also. Therefore he loses 16 per cent., whether he actually carries his silver tokens in his pocket, hands, or carriage, to the bullion market, or whether he accomplishes the same object through a bill of exchange. A bill of exchange is a monetary document, and the true theory of it in general is, that it is a document for the conversion of the monetary tokens of one country into those of another, and paying with the latter.

The *true scientific* idea or theory of exchange is, that money being a token, and at the same time a unit, it exchanges commodities (which is a part of its function) in terms of proportions stated through the action of buyers and sellers. Hence if two given commodities in country A which would barter for two commodities in country B, stand in value towards each other in the proportion of 2 *dollars* to 3 *dollars*, or, in general terms, as 2 to 3, while two commodities in country B stand in the proportion of 4 to 6, these two proportions are equivalents, and the commodities of each country are thus indirectly exchanged for each other by the intervention of the tokens of each country without loss. But gold and silver tokens, being not only tokens but valuable commodities as well, whose only market is the bullion or barter market where they are exchanged directly for each other, according to quantities in market, the purchasing power of the token as money in the country where it is current as a token is necessarily and unavoidably made inverse to its commodity value as bullion. Spoliation results as a mathematical necessity, not only at this time, but all the time through the bullion exchange *only*, as long as mono-metalism continues; but hereafter, unless universal mono-metalism is conventionally arrested, the spoliation will come through a fall of the purchasing power of the silver token in silver countries, a rise of the purchasing power of the gold token in gold countries, a rise of silver in bullion, and a fall of gold in bullion. The rise and fall may be more, or it may be less, but it must come, for the reasons given.

To make my theory clearly understood if possible, I maintain that every economist who writes a book affirms in some form or other, without knowing it, that money is a token. Adam Smith affirmed it in saying of the Scotch banks of his time that their loans should be repaid within short intervals, so as to make the inward and outward currents alike in volume for those intervals, and thus maintain the reserve at an even average, as closely as possible to outstanding notes. What necessity for this, if money is a bartered commodity and not a token? If money is a token there is meaning in his rule; if a commodity bartered, there is no meaning in his rule, and no reason for it which satisfies common sense. If, as some economists now say, there has been no rise of gold in purchasing power, and no fall of silver in purchasing power, notwithstanding the enormous loss of silver in trade, in other words in barter, and in still other words in bullion, what possible explanation of the fact is there or can there be, except that a rise or fall in the market of the raw material of the token has no direct reference to the purchasing power of the token; and thus they virtually admit the token theory. If raw material rises or falls, it is simply a rise or fall of raw material, the token, as such, rising or falling in purchasing power *only;* and the real meaning of this expression is, that if one commodity rises or falls geometrically, or, in other words, in quantity, in respect to other commodities, a standard measure of the former calls in the market for so much the less or so much the more of the latter, and this is expressed inversely and arithmetically, by an arithmetical fall and rise in money tokens employed by buyers and sellers, in indirectly bartering these commodities. There is no fall or rise in the material of the tokens, because the fall and rise of the material is in the market of the raw material only. All the confusion and all the contradiction which rises like a Babel, as often as people, whether instructed or uninstructed, learned or ignorant, talk about money, arises from non-perception of the complex fact that money is a token, and its material a raw commodity which has a market as all raw commodities have. But because token value is a much higher value than the raw commodity could possibly have, if it did not carry a token with it, the only market of the raw material of gold and silver tokens is a barter market of one for the other; and hence if there were only one metal instead of two, there would be no market for it at all; it would be a token only. Buyers and sellers are not bartering tokens, but they are bartering their commodities by the aid of tokens, whose material is of great utility, and has a barter market, because there are two materials to be bartered. The science of money will be a science of contradictions until this theory is adopted, and then the contradictions will disappear, and all monetary facts of which the human intellect takes cognizance be in harmony with the theory. All sound logicians will admit that a scientific theory of money of some kind, which will explain, and be in harmony with, all facts, is not only important, but absolutely essential, and that there can be but one theory taught at a time, and whatever that theory may be it is for the time the orthodox theory; and what I offer is a new theory to take the place of the orthodox theory. I contend that money has a function to perform, and not a value to be stated, and that the function stated as one whole is, to effect the interchange of commodities through human agency. I maintain that this function cannot be performed except through the agency of a token, which in special terms we call money. I maintain, further, that the function analyzed consists, not in valuing money itself, which would mean a function valuing a function, but in stating the values of commodities indirectly bartered, in terms of arithmetical proportions, the units of which go by the name of the money in use, and in paying money as tokens in exchange for the commodities. This makes the proportions complex, because every seller states the first member of the proportion in selling, and the last in buying.

SYNOPSIS.

No man in his senses will contend that the material of money would not be intrinsically very valuable as a commodity independently of its use as money, and that it has a high value as money also. Does its use as money give it a value over and above, and in addition to, the value it would have if not money? That it does, seems to be the opinion of all writers.

The question then arises, Is this value new intrinsic value to be added to the intrinsic value the metallic commodity would possess, if it were not money, or is it a value of a different kind coexisting with, but not to be confounded with, such intrinsic value? That question has not in terms been raised by other writers upon money, but that it is new and additional intrinsic value is necessarily implied in the proposition that money is bartered at its intrinsic value for commodities, and the latter for money, which is the theory commonly taught. But when it comes to describing the nature and object of money, this theory is entirely and unconsciously abandoned by writers, and their description in effect makes this new value a token value, although they are not aware of the fact. Some of the best criticisms upon my book are of this kind. Thus, one writer in a leading Western newspaper declares his analysis to be the whole matter in a nutshell. He says: " The metals gold and silver are valuable as money; because money is useful and there is a demand for it; because those metals are used as the material of money, and because it costs something to produçe them." He means, undoubtedly, that new intrinsic value is added to the old intrinsic value by the use of the metals as money. But let us see what this assertion really means. What is intrinsic value? It is an inaccurate expression, and its real meaning is the intrinsic utility of a thing which gives it value in the shape of another thing possessing intrinsic utility, which exchanges for it. The intrinsic value of money, if it possesses such value, must therefore mean value founded on intrinsic utility, which causes it to be exchanged. Utility is the foundation, logically and actually, of value in exchange. But the critic's theory is that this use of money consists of bartering, or, in other words, trading it, at its intrinsic value; in other words, increased value in barter arises from bartering. In other words still, value in exchange is utility, and utility is value in exchange, or, to reduce the expression to its last and equivalent terms, utility is utility; value in exchange is value in exchange; and utility and value are the same. Apply this formula to all commodities, and it means that the only utility of commodities consists in selling them, and they are sold merely for the sake of selling them. Every man who calls metallic money a commodity, bought and sold or bartered at its intrinsic value, or, simply, at its value, and then undertakes to describe the phenomena of money, runs at once into a contradiction of this kind, no matter how able and intelligent he may be. He insists without any analysis that metallic money is bartered, bought, or sold as a commodity, and immediately declares in some form that it is a token also, which is a contradiction in terms, because a token, no matter how valuable its material, has only the function of stating and exchanging values other than that of its material. I have seen a brief description of money in two books of late in this form: Money is, that money does. This is a very striking form of stating the fact that money has something to do itself as a token, in its function of stating and exchanging values for producers and consumers, and not something to be done for it in the way of exchanging it, as a commodity to be consumed itself.

Again, the function of money having no intrinsic value like paper money and bank credits, is said to be that of transferring titles to property. This is the prevailing doctrine, and it is very well and happily stated in a book lately published by Houghton, Mifflin & Co., under the title of Money, Trade, and Banking, by J. H. Walker. The meaning is, that money which has no intrinsic value is only a token for the transfer of titles, and by many, perhaps most writers, it is called in terms a token. But if it is a token, it must be such a one as I have described in this book and worked as a token by a process and in the manner therein set forth. If their whole ease is thus given away by all writers and my theory conceded, as to money having no intrinsic value, it must logically be conceded as to money having intrinsic value, for otherwise metallic money value must be not merely an abstraction, but a something which has no actual existence for consumers who never consume, but are everlastingly bartering without consuming. But is it true that buyers and sellers do not consume metallic money? Certainly it is not true, because money is worn and consumed in handling and passing it. But who ever heard of commodities being consumed in selling or bartering them? There is then a consumption of metallic money in handling and passing it. But consumption is not barter, but largely the result of barter, and of buying and selling. It is impossible, therefore, for metallic money to perform any function essentially different from that of paper money, and its function must be the function of a token made of a commodity which has utility for individual consumers, so great that they are willing to pay a token for every token manufactured as a raw commodity up to a certain point, although they cannot carry their consumption far enough to make the silver token materially lighter than now, under free coinage.

This theory must prevail at last, and when it does, and not before, will theory and facts harmonize. The prevailing theory and my theory lead to results differing world-wide, so to speak. It is useless to discuss free trade and protected trade, tariffs, taxes, and bounties, under the prevailing theory. My theory leads to banking and bank notes regulated more scientifically by reserve; to general bi-metalism and international mints, or national mints internationally regulated. Editors of newspapers in cities are in general educated men who have to think and write rapidly, and their criticisms upon such a subject are as intelligent as any. I am disposed to thank any one who is willing to take the trouble to examine and criticise any of my books relating to money. The criticisms of intelligent men are what I seek.

The science of political economy is one of vast importance, but we must have a better theory of money before it can have practically the authority it ought to have. If 99 per cent. of all buying and selling is merely the transfer of titles to property, and the 1 per cent. the transfer of property itself, we may with Professor Price virtually *disregard* the 1 per cent. as a matter that will take care of itself, and regard only the 99 per cent. What we then want is an analysis of the mode in which the titles of the 99 per cent. are transferred. How is it done? It is impossible to do it in any other way than that described in my analysis. The seller transfers his title and takes a token. It must be a token, because the seller of whom he will buy may know nothing of the buyer of whom he procured his evidence of the transfer, in the shape of money.

The seller sells for 10 dollars and buys with 5 dollars. The property he parted with stands to the property he acquires, as 10 dollars to 5 dollars.

But inasmuch as the dollars have no intrinsic value, this proportion is the same as 10 to 5, or, in other words, the latter is a more general form of stating the proportion as a proportion merely. This is what all buyers and sellers are doing, and this makes them a corporate body, because they are working to a common intent and purpose. Money values, therefore, if we can keep "intrinsic value" from obtruding itself on our attention, are the complex thing composed of parting with title to commodity and taking a token which confers the right to obtain title to other commodity, reckoning values through the action of all buyers and sellers in terms of arithmetical proportions whose units have attached to them the names of the tokens employed.

Having gone thus far in our analysis of money having no intrinsic value, and regarding it steadfastly with a determination not to be misled by the intrusion of intrinsic value upon our reflections, we shall gradually perceive that if a token without any intrinsic value transfers titles to property in terms of arithmetical proportions, this contrivance is as natural to man as language itself, and a token which has the highest degree of intrinsic value must necessarily perform the same function as one which has no intrinsic value. We shall then perceive, that if the token possessing intrinsic value has no relevancy to buying and selling in excess of 1 per cent. it might as well be left out of the case entirely. We shall further perceive, that the metallic token possessing intrinsic value performs the same function whether actually handled or not, through buying and selling, just as long as convertibility is maintained, but that its function of limiting the creation or the use of tokens, itself included, can only be maintained by its limitation of loans in whatever form. We shall further perceive, that although the metallic token, whether of gold or silver, is intrinsically exceedingly valuable in respect to its material, this has no direct reference to its function, and hence all the buyers and sellers of the Western world would be glad, as consumers of the metal in the character of tokens, to get rid of ¾ or more of the silver in their tokens, if they could, and pay such a price as they could afford for this ¾, in the shape of spoons, cups, and other goods; but this is impossible under free coinage. Of one pound of silver in tokens, ¾ and upwards has no intrinsic utility for consumers of tokens, who would gladly get rid of it, if they could, and it has no intrinsic value for them as long as they cannot consume it in the shape of plate and other goods, any more than the viands had for Tantalus who could not reach them, or the superfluous gold for king Midas who could neither eat, drink, nor wear it in such a manner as to protect him from the weather. Utility is the sole foundation of value, and the utility of excessive weight in a token is really no utility at all. This is the true ground of the objections to silver, which is, logically although illusorily, placed under the head of "Standard."

Bi-metalism is essential, not for its own sake, but to distribute the load of silver, and put a stop to monetary spoliation, whether directly by actually moving metallic tokens, or indirectly, through monetary documents called bills of exchange.

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